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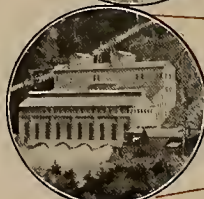
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Smile, and the World Smiles With You

ONCE upon a time, someone said that the eyes were the windows of the soul. This naturally leads to the discussion of a smile as a business as well as a psychological asset. True, the eyes are but one of the several facial components that contribute to the production of a smile, but nevertheless, it is the eyes that give life to the outward sign of warmth of soul beneath.

The smile, from the standpoint of its effect when projected outward as a creator of better public relations, is the underlying theme of an article by R. A. Balzari that will appear as one of the many features in the next issue of the Journal of Electricity. We think that the idea which will be projected in this story is going to take the entire industry by storm. At least, be prepared to smile.

So important is the smile, that a "Smiles" committee is functioning energetically within the Pacific Coast Electrical Association, and the smile idea is being studied with greatest care. There is no gainsaying the fact that one frown can utterly ruin the day for everyone with whom he comes in contact. It is equally true that the man with a smile can spread cheer and good fellowship wherever he goes.

Support the smile idea. Take one, and use it for your very own. Wear one, winter and summer. Carry it into your home and your daily task, and you will make this world of ours a better place to live in.

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The Bryant Beaded Ball



EVERY Bryant Pull Socket has the Bryant Beaded Ball on the end of the chain. It is a distinguishing mark. It identifies a Bryant socket — and is a convenience to you.

Examine the illustration below. See how firmly the ball is attached to the chain. Nothing can pull it off without breaking the chain. But you can slip it off and on in a jiffy. It is a cinch to alter the chain length on a Bryant Pull Socket.

The Beaded Ball is one of the features that make

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We'd like to send you a sample of this Bryant Beaded Ball together with a Key Chain. Your name and address on a postcard and the words, "Beaded Ball" are sufficient. Send for it.



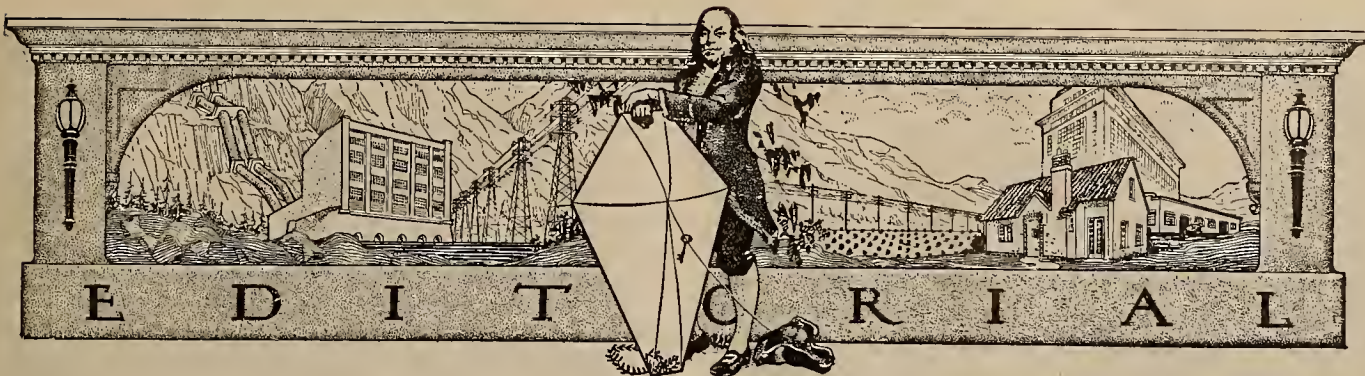
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A Message for the New Year

TRADITION has established the beginning of a new year as the time for the interchange of gifts, felicitations, and, most of all, for the adoption of good resolutions for the year to come.

NINETEEN-TWENTY-FOUR lies before us as a book with uncut leaves. It is for us to write the record on its pages as the year unfolds, so that when in retrospect we glance over them after another twelve months have slipped from us forever, we may not be ashamed of our legacy to posterity when we are called to account for the use we have made of our opportunities.

IT is the dream of constructive thinkers in our Western country that the day will come when every branch of the electrical industry will be welded into a harmonious whole. This does not mean the consummation of a physical union, nor the organization of a super-electrical trust, but a spiritual union, based upon tolerance of the rights of the other fellow, a sympathetic understanding of his difficulties, and a willingness to lend a hand to assist him over the rough spots.

GREED, selfishness, bigotry and intolerance have no place in this scheme of things. The little Japanese statuette that "Speaks no evil, sees no evil, hears no evil," might find a place in the hearts of all of us, as a reminder that to build up, rather than to tear down, is the only excuse for our existence.

IT has been said, that since the dawn of civilization the progress of the world has been solely material; that morally, we are still wallowing in the morasses of the early Pleistocene. This is harsh, and like the moralizations of most cynics, is no more than a half truth. Nevertheless, there is much to be done, and we can play our part in doing it, if we will.

LET Faith, Hope, and Charity guide us: Faith in our industry, and in ourselves in piloting it toward the better service of mankind; Hope, that we may not fail to realize in the fullest measure the greatness of our opportunity, and Charity toward our co-workers within the industry; not alms, but Charity, in our sympathetic spirit of helpfulness, regardless of creed, race or condition of servitude. And the greatest of these is Charity.

HAPPY NEW YEAR!

Politicians Feel Power of Customer Ownership

RECOGNITION of the potentialities of holders of hydroelectric utility securities in a municipal election was given by a member of the San Francisco Board of Supervisors at a recent meeting of that body. In the discussion relative to passing an ordinance appropriating \$100,000 for the purpose of making a valuation of the lines of the two electric companies serving San Francisco, this particular member of the board voiced his objections. One of his principal reasons for opposing the measure, he stated, was his desire to avoid incurring the ill-will of the 25,000 or more holders of the securities of the two companies who reside in the city. He recognized in these customer owners a power that would make itself felt in the next municipal election.

It should be gratifying to those central stations which have pioneered in the customer ownership movement and which have been firm in the belief that customer ownership was truly public ownership to know that the politicians are beginning to be wary of attacking the electrical industry. It should serve to spur on to greater effort those companies which have adopted the customer ownership plan and at the same time convince those utility executives who have not yet seen the light that customer ownership is a weapon that they cannot afford to overlook.

Arizona and the Development of the Colorado River

THE Colorado River situation continues to hold the interest of those who are vitally concerned with hydroelectric progress in the West. Recent developments have once more brought the questions of flood control, irrigation and power generation to the fore. James B. Girand, who holds a permit on Diamond Creek, has commenced the construction of a dam at that point on the river. Mr. Girand was threatened with the loss of this permit by the refusal of the Arizona Water Commissioner to extend the time limit as he had requested. He forestalled this loss by starting work on his \$36,000,000 project.

In this connection, there appears on another page of this issue a statement from Governor Hunt of Arizona, outlining the stand of that state with reference to the development of the river and its objections to the Colorado River compact. One of the chief objections was that Arizona feels that the power resources of the river are its greatest natural resource and consequently the state should derive certain revenue from them. Before a recent meeting of the Federal Power Commission a committee from Arizona proposed that the state develop the power and sell at a profit to whosoever desired to buy. Bonds would be issued to finance the project.

This scheme overlooks one important factor. Arizona needs additional revenue now. Flood control is an immediate necessity. The project which the state proposed is a thing of the future. More than this, instead of receiving additional income, Arizona would be forced to pay interest on the bonds issued until such a time as revenue could be derived from the sale of power.

It would appear that the most logical process for the state to follow is to allow some outsider to step in and develop power immediately. Then the state would derive the income it requires through the routine process of taxation. Rather than oppose Mr. Girand, the state would do well to welcome him with open arms.

A Sales Plan for Every Month in the Year

COOPERATIVE merchandising efforts have increased in number and in the scope of their endeavor. The experiment once tried has worked well and has proved of beneficial application. Results in those sections where the plan has been tried have been so satisfactory that the value of the idea is well established. Sales resulting from cooperative advertising and selling movements have generally exceeded those where no cooperation was employed and dealers who have participated in such movements are enthusiastic for the continued use of similar campaigns.

Inasmuch as no business can be successfully conducted on a day-to-day basis but must instead be guided by a carefully thought out plan of action and, further, inasmuch as the cooperative selling plan has worked so advantageously, it seems that now is the logical time for dealers in electrical merchandise to give heed to the necessity for concerted action in the promotion of their individual businesses. A cooperative advertising and selling plan can be mapped out to cover each of the twelve months of 1924 and featuring some particular class of merchandise for each month, care being taken to feature merchandise with particular reference to its seasonal application. Such a plan will have the decided advantage that all dealers in a given section will be giving prominence to the same class of devices at one time and that added force will be lent to the importance of the device and to its domestic, commercial or industrial application. Precedent has already established that such selling plans are much more successful than those where all dealers are trying to feature different articles. Those who have tried to row a boat know how much easier it is to go with the tide than against it. Why try to stem the tide of cooperative merchandising?

Include Provision for Electric Range in Every New House

CONSIDERABLE criticism has been directed toward members of the electrical industry for their failure to utilize the appliances which they sell and recommend for the use of others. Especially has this been true of the electric range. Suggestions have been made that every executive and every employee should use an electric range in his own home. More than this, special prices have been made to employees and satisfactory purchase arrangements made. Certain manufacturers and central stations have been in the lead in this movement.

Undoubtedly much good has been accomplished in this way and many ranges placed in service. However, it would appear that one important fact in

all such plans and suggestions has been overlooked. The majority of the rank and file of the electrical industry,—and they are the ones to whom such plans have been directed,—live in rented houses or apartments. It cannot be expected that a man living in a rented house will finance the cost of installing an electric range, especially when this cost ranges from \$45 to \$55. The wiring, once installed, becomes an integral part of the house itself, and cannot be removed, like the range, when the tenant moves.

One solution for this problem lies in convincing the builder of houses and apartments that an important part of the electrical installation is a provision for the installation of an electric range, whether or not such a range is to be a part of the original equipment of the house. Not only would this benefit those members of the industry who live in rented houses and who would like to use an electric range, but it would considerably lessen the sales resistance, for the item of installation cost would be eliminated from the purchase price of the range.

Another Reason for Private Ownership

THERE is no doubt in the minds of those connected with the electrical industry that municipally owned utilities should be under the jurisdiction of utility commissions, just as the privately owned ones are at the present time. In fact, a measure to bring this about in California was defeated two years ago. It is gratifying to note that there are others who have the same feelings about the situation. The following editorial from the Redlands (Calif.) Facts points out one of the injustices of municipal ownership:

Advocates of municipal ownership of utilities will now have an interesting situation to watch. The cities of Los Angeles, Burbank, Glendale, Azusa, Riverside, Anaheim and Tehachapi purchase electrical power at wholesale from the Edison company and have their own distributing lines. The Railroad Commission has given these cities a reduction of 7½ per cent in power rates. Will this reduction be passed on to the people? The consumers who buy direct from the Edison company get a reduction of 18 per cent. That reduction is direct. Every consumer will find his bills less by that percentage. Will those who get their bills from the supplying municipalities get a direct reduction or will the cities absorb the difference and use the extra money?

A New Venture in Public Relations

PUBLIC relations departments in the central station industry have developed a new slogan. To all intents and purposes, it may be summed up as "Give the Public the Facts." In newspapers, in company bulletins to both stockholders and employees and in letters to consumers the companies are striving to tell their story to the people whom they serve. That they are meeting with success is indicated by the good will which is manifesting itself toward the utilities and by the friends they are making.

On another page in this issue there is described the latest venture in this direction,—a venture on a scale surpassing anything yet attempted by a western utility. The Pacific Gas and Electric Company is placing its story not before employees and stockholders alone, but before both of these groups and its consumers besides. "P. G. and E. Progress," the new

monthly organ which has been designed to accomplish this, is to have a circulation of 400,000 copies.

The announcement made by Wigginton E. Creed, president of the company, in the first issue of "Progress," will interest utility executives for it defines a new policy in public relations work. A quotation from this announcement follows:

"The 'P. G. and E. Progress' will be published by the Pacific Gas and Electric Company as a routine of company operation for the mutual benefit of the company and its many, many thousands of customers and owners.

"The aim of the company has been to win the public good will by deserving the public good will.

"To this end, the company has intelligently developed the gas and electric industries to meet the prodigious growth of a vast section of the State of California, and in that work 'Service to the Public' has been its watchword.

"To this end, the company will never hesitate to 'speak up' and tell its story in order that the public it serves may know and understand its purposes, its accomplishments and its policies.

"The 'Progress' is put forth as a natural and logical development of the old and tried policies of the company.

"It will be primarily a journal of fact.

"It will record the growth of the state and the territory the company serves, the growth of the hydroelectric industry, the development plans of the company—the problems involved in building the Commonwealth of Destiny.

"It will present the facts involved in financing and operating the great gas and electric industries, and any and all other facts which may prove useful and serviceable to the public.

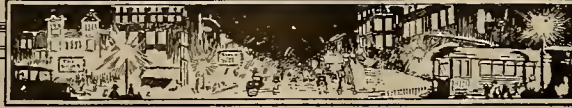
"In short, the 'Progress' pledges itself to be an authoritative source of accurate information for the public."

This newest step in public relations is of particular interest at the present time on the Pacific Coast in view of the necessity of public good will toward the hydroelectric utilities on account of the impending political situation. Needless to say, the venture will be watched with the keenest of interest by the entire electrical industry.

Appliance Merchandising Campaign of Southern California Edison Company

SPECULATION and rumor regarding the appliance merchandising campaign of the Southern California Edison Company has caused the editors of the Journal of Electricity to secure from the executives of that company a statement outlining the policies upon which the campaign is based and the methods which the company will pursue. This statement appears on page 7 of this issue in the form of an article by A. W. Childs, manager of the commercial department of the company. We recommend that all members of the electrical industry carefully read this statement before forming an opinion. The columns of this journal are open to, and the editors solicit, comments on the program which the Edison company has adopted.

CURRENT COMMENT



Among business men, there are none more cognizant of the dangers of state or municipal ownership of hydroelectric utilities than the financial interests, especially the investment bankers. Their attitude regarding the proposed California Water and Power Act, once defeated yet slated for presentation to the voting public of that state again in November, is enlightening. The following editorial headed "The Return of the 'Water and Power' Players," is taken from "The Review," published by Strassburger & Company, San Francisco bond house:

To "gall," no less than to guile, the father of lies owes his successive triumphs, and unless the proponents of the next California Water and Power "Act" are of a different kidney to their predecessors, they will have to rely on sheer nerve to carry through their project. We know, indeed, that this is to be their program, that they are resting whatever hopes they may cherish on the power of the "tell a lie and stick to it" policy. By such means it is that they think to reach their objective, control of the state purse—into which they picture themselves emptying the contents of the pocket-books of everyone outside the "inner ring."

There is no danger that they will succeed, if only those who know what private companies have done and are doing, can be induced to realize that the average man does not know, and that a strenuously pursued work of education must be initiated without delay and steadily continued until the snake is scotched.

The claim is that the public can sell light and power at lower rates than those allowed to the private companies ("allowed," for the fixing of rates is not left to the private companies). This never has been done, is on the face of it impossible; it is not possible even for a public authority to sell at equally low prices. Because materials and labor are obtained from the same sources, whether business men or politicians run the plants and executive offices; and the latter may be relied on always to pay more for the working of both. The public official is in no need of qualifications for the job he holds, other than "pull" and the fawning of the spaniel. If he happens to possess ability, it will avail him nothing; assured hindrance in its exercise, and inadequate remuneration, its owner will probably transfer it as soon as he can to a private employer. "Common" labor will be able to force payment of unduly high pay, because votes are precious; the quality of the work given in return will certainly not be too high. The private corporation has always and inevitably an advantage in production costs that will far more than counter-balance the supposed benefits of "sale at cost" so loudly brayed about. A good deal might be said about public "accounting," the greatest joke of all, but the subject is a serious one—for the already over-burdened taxpayer. The battle will never be finally won until the public is educated, and the process is no easy one. It is, however, easier to keep a man from venturing on quicksands than it is to extricate him when he is partly engulfed.

Where the financial interests devote considerable thought and study to all phases of this important subject, it would seem that the newspaper editors devote none at all, but merely reprint the glittering promises and arguments of the uninformed politicians who sponsor such measures. Read what the

editor of the Los Angeles Examiner has to say on the same subject:

California must bend its efforts toward owning, operating and distributing its entire hydroelectric power supply.

No forecast meets with more general agreement among scientific men than the statement that the mechanical basis of tomorrow will be hydroelectric power.

Years ago, mankind started a precedent that has cost the people untold billions of dollars, untold burdens of misery. This was the private ownership and exploitation of the world's coal supply.

Mankind knew no better then. We know better today.

It is due to this one historic mistake, more than to any other, that the average person has reaped but a portion of all the huge benefits of modern machinery. Private wealth has taken its toll.

The coal supply, however, is approaching exhaustion. At the present rate, it is stated, the dominion of coal will end within thirty years.

And then—hydroelectric power will take its place.

Already we are well into the transition. Electricity, every day, is taking over more and more of the mechanical duty that has been performed by coal.

Electricity can do more work, and in more ways, than coal ever could.

Now, America's streams, the source of this energy, are harnessed today only to the extent of 900,000 horsepower; their total capacity is 8,000,000 horsepower.

Regard electricity as a gigantic slave, working for humanity.

So regarded, it is seen as the mightiest slave that ever strode the earth.

This gigantic slave can be made, by proper action NOW, to work entirely for mankind. To work, cheaply and well, for women in their homes, men in their factories and railroads.

Or this most powerful slave can become the standing army of a small financial oligarchy; an army keeping the people in subjection to a degree the world has not yet seen.

Most of our electrical development, thus far, is in private hands. And already we have felt the ruthlessness of the control which it effects.

But we are barely at the beginning of the Age of Electricity. We still can act to save ourselves, to benefit ourselves and our children. If Californians look ahead and realize what electricity means, California will take charge.

Preliminary political skirmishes among the politicians over the form of the proposed water and power measure which will be voted on in Washington next November are already occurring.

Water Power Act From present indications there
Agitation Lively will be plenty of legislation on the
in Washington subject on the ballot which the voter will receive at the polls.

The following editorial which is taken from the Seattle Post-Intelligencer, one of the strong municipal ownership organs, discusses some new phases of the subject:

Congratulations to the men and women gathered today from all sections of the state to give consideration to this

commonwealth's most acute present problem—conservation for the people of her matchless hydroelectric power.

You have taken time from busy tasks to lend your counsel and study to this most far-reaching economic question. One or two generations to come may rise up to call you blessed.

Several proposals will come up for your attention and decision.

The first and most important thing, however, is that you take a definite stand against the Reed power bill, referred to the voters by a reactionary legislature.

The task that is second in order of importance is that some adequate counter-proposal be set up as an alternative to the Reed bill. It is for you today to decide what step—and how long a step it shall be—shall first be taken in the way to a fair and ultimate solution of this grave problem.

There was a bill presented to the 1923 legislature that proposed one decidedly forward step. This bill, sponsored by Homer T. Bone, the legislature rejected, by a 57-39 vote, in order to refer in its stead the power-trust-favored Reed bill.

The rights sought in the Bone bill are fundamental in the campaign that is to be waged this next year for public power ownership and conservation.

Legislation proposed in the Bone bill would permit municipally owned electric plants to sell their surplus power outside their corporate limits. It would permit these cities, or others, to construct, own and operate transmission lines and distribution systems. It would pave the way for the publicly-owned hydroelectric plants NOW IN OPERATION to extend their cheaper service to communities which cannot afford the heavy first construction costs. It would bring CHEAP POWER to thousands of rural homes not too far distant to be hooked on.

These rights must not be restricted, bound about with any suggestion of a gross earnings tax. That is the nigger in the Reed woodpile. Here is the line of cleavage between those favoring public ownership and conservation of power and those opposing it.

Establish the right to tax a publicly-owned property and the state constitution itself is violated. Our original law-makers in Section 2 of Article VII set their faces against it. What they directed might not be accomplished directly, we today have no right to attempt indirectly.

Give any legislature the right to tax any publicly-owned enterprise and the door is open to the stifling of that enterprise. Judging by past legislatures it would be speedily and summarily stifled.

An elaborate legal structure for the preservation of the public's interests in the state's "white coal" resources will be necessary. It is not enough, in the final analysis, merely that the rights of Seattle, Tacoma, Centralia, Ellensburg and Aberdeen be protected. It is for you men and women, meeting today in Legion Hall, to decide the point to which legislation is in order now.

It is important that the first test of strength with the power trust be won, if that octopus ultimately is to be rooted out of state politics. Its natural line of operation will be to becloud the issues, to confuse the voters. The most skillful counter would be to clarify and simplify the issues. Whatever is done today, let all present realize that the battle ahead will be most bitterly fought. And the wisest general is he who is shrewdest in his selection of the ground upon which he will fight.

The first objective is to defeat the Reed bill.

As to the proposed constructive legislation, the simpler, the clearer, the more concise and pointed it is—providing it establishes for all time the few fundamental requirements—the more likely is success. First make sure of the fundamentals.

Compare the attitude as set forth in the above editorial with the saner view in the following which is taken from The Manufacturer:

The State of Washington is asked to vote on a project to secure control of electric utilities in that state.

The measure is promoted by advocates of state ownership who have been brought in from North Dakota and Wisconsin for that purpose.

By means of a proposed initiative measure municipalities in the state are asked to bond themselves for from \$400,000,000 to \$500,000,000 to develop water powers under political control. California turned down a similar program.

Up to the present, millions of private capital have been employed to develop water power for electric utilities under state regulation. Public utilities under private management pay taxes on every dollar invested, while under public ownership the people are asked to mortgage the wealth of the state and tax their own homes for a public service now furnished them at cost plus interest under state regulation.

While any state faces the uncertainty of adopting such a public ownership program, the man with a dollar in his pocket to invest, very wisely delays action in that territory. There is no inducement for him to enter into competition with tax-free and tax-financed undertakings.

What would happen if a law was proposed to prohibit the development of private industry and require cities and states to maintain their own public utility properties? Such a proposal would be instantly rejected.

Socialistic agitators are clever enough to so word their measures that by indirection they establish publicly-owned plants maintained by taxpayers, thus creating a condition that makes it impossible to develop competing private industries.

In this manner is private industry just as surely driven out of the field as if a direct measure prohibited it from doing business.

The whole proceeding is a mockery of free institutions in America under a government established for the protection and encouragement of its citizens rather than a government limiting and restricting their activity and progress.

Superpower agitation throughout the country has been reflected in some wild hazards on the part of various newspaper editors who know little or nothing

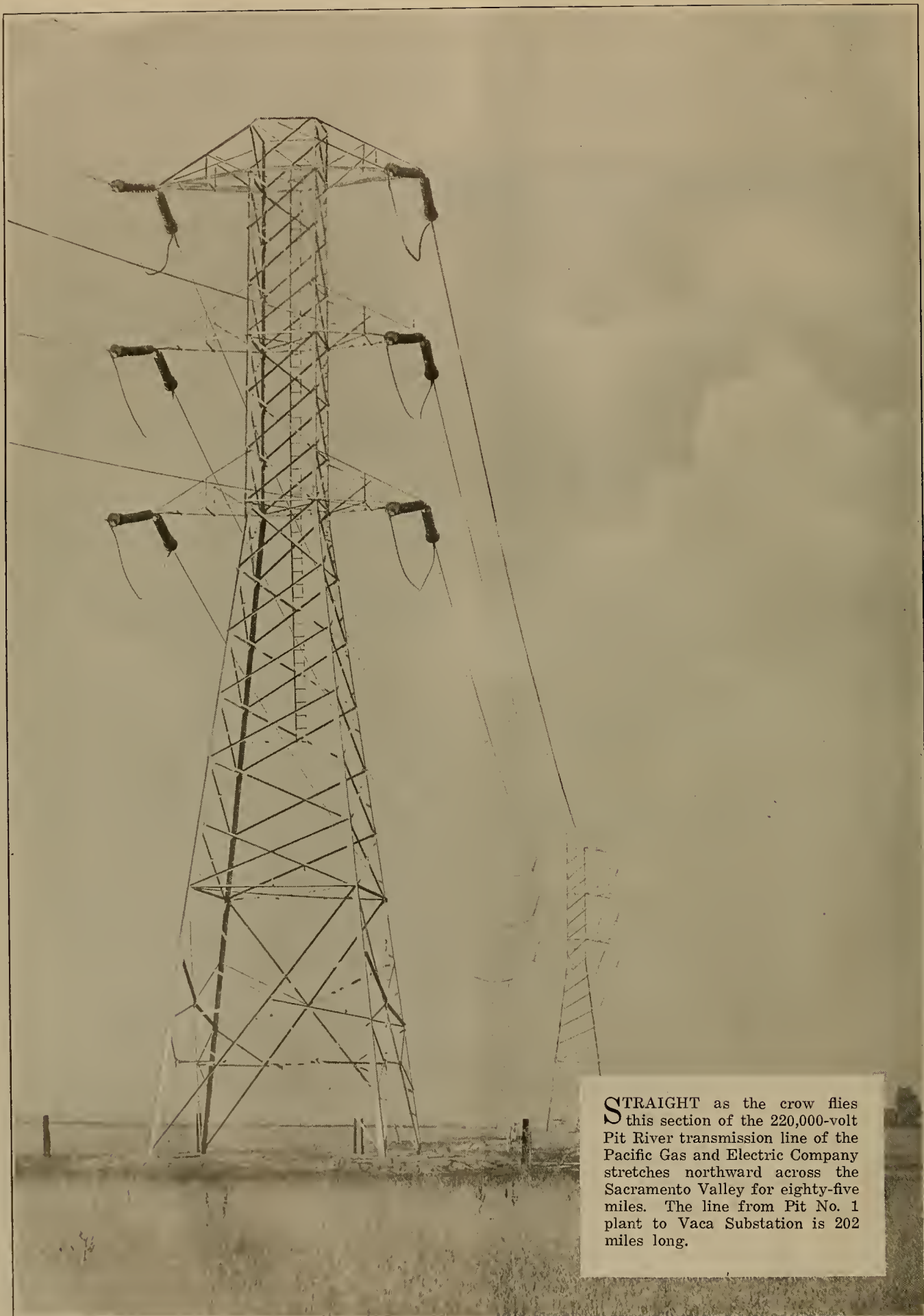
about the subject. It has been called a boon by some and a menace by others. Needless to say, it is a pleasure to read a statement from an editor who knows whereof he speaks. The following editorial is taken from a recent issue of the San Francisco Journal:

There is nothing else left in prospect for the public than to picture each citizen struggling on to the end of his days with a ball and chain around his neck, with the other end of the chain firmly grasped in the claw of the terrible monster of Super-Power. That is the horrid menace that the yellow press has discovered to be hanging over the country today. The only escape from this wretched slavery is for the country to adopt socialism and fling defiance at the teeth of the dragon. Socialism is guaranteed to fix him. Perhaps this counter-irritant will be so much more terrible that the dragon will throw up his claws in despair.

The future will be the super-industrial age when everything will depend on power, and as the time approaches when the coal supply will become exhausted, or the price will rise too high to permit of its economical use, then the "white coal" of the engineer will be the supremely important factor which will control all industry. This is hydro-electricity, and a larger share of the potential supply in this country lies in the western watersheds. The Pacific section has 40 per cent and the mountain states 30 per cent of the visible supply. It is alleged that there is a conspiracy on foot to corral this supply in private hands and then to connect up these units so that they will form virtually one company with a monopoly of all power.

It does not occur to the alarmist that the alleged monopoly will have any inducement to deal generously with its customers, or if it does not there will be any power to force it to do so. The terrible oil monopoly which we have heard so much about for years has indeed grown to be a giant, but curiously enough its history has been one of continually lowering prices and increased service, a result that could not have been attained without the size and economies which the alleged monopolies have attained. Industry could stand a considerable amount of that kind of choking to death.

It is very true that the modern tendency is toward linking the various power companies together so that they may be able to act in cooperation in the furnishing of energy. The object of this is greater economy and efficiency and a more dependable supply and cheaper operation. When not so much capital is required for alternative equipment and stand-by, power should be cheaper.



STRAIGHT as the crow flies this section of the 220,000-volt Pit River transmission line of the Pacific Gas and Electric Company stretches northward across the Sacramento Valley for eighty-five miles. The line from Pit No. 1 plant to Vaca Substation is 202 miles long.

The Southern California Edison Company's Appliance Campaign

By A. W. Childs

Manager, Commercial Department, of the Southern California Edison Company

CONSIDERABLE interest is being shown throughout California in the plan of the Southern California Edison Company to build up its residential load by the sale of household appliances.

In order that the electrical industry at large might understand the details of this plan, three meetings have been held within the last six weeks. For the benefit of those who could not attend these meetings, an outline of the plan is here presented to the readers of the Journal of Electricity.

The Edison company has decided to solicit appliance sales among its consumers with the expectation of securing sufficient additional load to partially offset the reduced income on existing business resulting from lower rates for service which became effective Nov. 15, 1923. Sales will be confined to appliances using around 500 and 600 watts, such as irons, toasters, percolators, etc. All sales will be at list prices and where time payments are desired by the purchaser an additional charge will be made.

The company expects that the lower rates for service will undoubtedly mean an increased use of electricity for all purposes and will particularly lead to a greater application for domestic uses.

In making this adjustment in its sales policy the Edison company is doing what any well-managed concern would do. It is an axiom of business economics that the only way to meet lower prices is through greater distribution. It is also an axiom of business economics that any activity which encourages a greater use of a commodity benefits every concern selling that commodity, whether it is directly responsible for the activity or not. However, in most lines of business increased production and distribution precede the lowering of prices, but in the case of the Edison company the lower price comes first and the company must arrange its affairs to meet this changed situation.

Before deciding to embark on this new policy, the Edison company made a careful survey of the situation and discovered some things which are not generally known by the trade and yet are tremendously significant to everyone in the electrical business. The Edison company in 1922 connected 30,000 new houses; in 1923, 40,000, and a forecast for 1924 indicates another 40,000. A summary of appliance sales shows that these new home owners have not

THE Edison company added to its lines during 1922, 30,000 consumers; during 1923 the increase amounted to 40,000 new customers and the same number of new connections is estimated for 1924. At the same time a survey of homes in Edison territory shows but two electric appliances per home. These and other reasons explained by Mr. Childs in this article account for the appliance merchandising campaign which the company has undertaken.

been canvassed in any adequate fashion. Thousands of prospects for electrical appliances have been ignored by the industry. In Edison territory there is an average of less than two appliances to a home, whereas five should be the minimum and twenty-five is the possibility.

People have not been using electric appliances for two or three reasons. In the first place, many of them are not familiar with the electrical devices and what

they can do. A large portion of our new population comes from the farms and small towns of the Middle West which as yet have not had adequate electrical service. These people are accustomed to oil lamps; electric lights are a novelty and an appliance such as an electric toaster is something utterly strange. Simply to put a toaster in the show window does little good, for unless its use is explained, it may be taken for a nickel-plated mousetrap.

In many communities the electrical dealers have done excellent work. In other districts they have been so busy with wiring contracts, fixtures, vacuum cleaners, washing machines and similar lines that they have not had the time to cultivate the appliance business systematically.

It must be apparent to anyone who has made even a casual study of the subject that people cannot be expected to purchase and use appliances unless their merits are explained. Advertising does its share, show windows help, but house-to-house canvassing is the way to bring these modern servants directly to the housewife's attention.

The Edison company's decision to take up this work is therefore based on four factors. First, a reduction in rates with a corresponding reduction of gross revenue. Second, the obvious willingness on the part of the consumer to use more electricity because of the reduced rate. Third, the evident neglect of the appliance market as shown by the company's survey. Fourth, the conviction that every branch of the industry will benefit from such a systematic sales campaign as has been outlined.

When the Edison plan was first made public and before electrical dealers had an opportunity to study it, there was a tendency for the dealer to say, "The Edison company has invaded my field."

The question is not whether the dealer or the central station is the logical distributor of electrical appliances. It involves fundamentals far deeper than

that. The Edison company is spending \$2,000,000 a month in new power plants and line extensions to meet the demands for service. It is these expenditures that provide an outlet for the contractor's goods and services. Anything that disturbs this systematic electrical development upsets the entire industry. Just now, the company needs off-peak domestic business.

Accordingly, a careful analysis of this whole situation should demonstrate to the manufacturer, the jobber and the contractor-dealer that the company's proposed appliance campaign is the obvious means whereby the electrical trade in Edison territory may be stabilized. The Edison company is going to sell appliances, to be sure, but for every actual sale made there will be twenty people interviewed, who are not ready to buy at the time. These people will buy later from their regular dealer. The salesman's visit, moreover, will lead to an interest in other appliances such as vacuum cleaners, washing machines, ironing machines and so on, which will not be sold by the Edison company. All such inquiries will be referred in an impartial fashion to dealers. Furthermore, the Edison company will display these larger appliances in its offices with the dealer's card attached. The company will also refer to the dealers in its advertising. The Edison salesman, while in the consumer's residence, will take notice of the wiring and recommend the installation of convenience outlets and similar things, all of which will naturally be turned over to the local contractors.

Every industry from time to time is faced by situations which demand a change in its tactics. There were those who were greatly alarmed when the Mazda lamp was introduced, but we all know how the entire industry benefited from its introduction. The present situation has disturbed some of our good friends, but now that the plan has been so thoroughly discussed by the trade at large, there is the same unanimous feeling that nothing but general good to the industry as a whole can result.

Measuring Water with Salt and Electricity

MEASUREMENT of large quantities of flowing water is at last being reduced to the simplicity which the uninitiated would think obvious. To be sure, there have been, for many years, good meters and other measuring devices, but in many situations these are impractical or too costly. Modern hydroelectric power plants use water in enormous quantities. For example, a water wheel was recently tested with a discharge of 3,500 cubic feet per second, or three times the quantity of water used by the City of New York, with its population of six million persons. High efficiency in power development is most important, but the degree of realization can be known only through precise measurement of the quantity of water and its fall through the turbines or water wheels. Some of the methods of measurement have not been satisfactory in degree of accu-

racy. The most accurate method (almost perfect) is weighing in tanks on good scales. Manifestly, it is quite impracticable in many situations.

Professor C. M. Allen, of Worcester Polytechnic Institute, has recently added a method which is giving results of remarkable precision. Like other methods of modern science for measuring quantities of many kinds, it is indirect. It depends upon the fact that common salt increases the electrical conductivity of water in proportion to the quantity of salt dissolved in the water. The salt velocity method consists in accurately timing between two known points the passage of a charge of brine which has been injected into the water at a point upstream. Dividing the volume of the conduit between the two points by the time of passage gives the rate of flow, or discharge.

For introducing the salt, a strong brine is injected under pressure at an upstream point through a system of small pipes so placed as to give approximately uniform distribution in the cross-section of the conduit. At one or more convenient places downstream, electrodes are inserted in the conduit and used to detect the changing conductivity of the water as the brine passes. The timing of the passing of the brine is done by means of a stop-watch or recording seconds clock and indicating or recording electrical instruments.

The instant of introducing the brine may be registered by a switch operated in conjunction with a quick-opening brine introduction valve, or by a pair of electrodes placed below the brine distributing system. The times of passage by the downstream points or sections of the conduit are obtained by the use of one or more pairs of electrodes inserted in the conduit at each point.

The recording chart can be run at various predetermined speeds to suit the conditions of the test. All events can be registered mechanically or electrically on this chart, including time of introducing brine, passing of brine by one or more electrodes, and the elapsed time in seconds. From this chart, the actual time of the passing of the brine is obtained.

Comparative tests of the salt velocity method with the Venturi meter, the weir, and the weighing tank, show it to be very accurate. It requires no unusual equipment for controlling the flowing water, no huge tanks and scales, no long interruption of the operation of the power plant in which the water is being used.

Experiments were recently made on an 8-ft. pipe line over 3 miles in length with four pairs of electrodes installed in the line. About fifty minutes were required for the charge to pass through this pipe. Time of passage was accurately recorded at each pair of electrodes, the last pair giving as distinct a curve as any of the others.

Although this method of measuring water has been used as yet only at power plants, it is equally applicable to pipes, flumes and conduits for water supply and irrigation, and even to the measurement of stream flow.

How Arizona Feels About Development of the Colorado River

By Hon. George W. P. Hunt
Governor of Arizona

THE decision in the matter of the Colorado River is the most momentous one Arizona will ever be called upon to make. Its whole future as a state is tied up to this proposition. We cannot afford to make a mistake; consequently we are taking the time to secure the fullest possible data on the subject.

The only reason for the compact is the desire of the upper basin states to conserve for their own use sufficient water for their purposes. The authority granted the commission which drew the compact was to allocate the water between the states. This was not done. The water was allocated between the upper and lower basins. This is the first objection to the compact, as it leaves Arizona in the lower basin occupying relatively the same position which caused the upper basin states to insist on a compact.

This objection is made all the more important because of the linking together of the propaganda for the adoption of the Colorado River compact and the building of a dam at Boulder Canyon, as is outlined by the United States Reclamation Service and in the Swing-Johnson bill.

It may be asked, Why should there be objection in Arizona to a dam at Boulder Canyon? The answer is that it is starting development of the canyon at the wrong end and that a dam at that point would limit agricultural development in Arizona from the Colorado River to 280,000 acres of land. The power development at that point would largely benefit California, and Arizona would derive little, if any, benefit from it.

It is argued that it will be impracticable to irrigate anything in excess of 280,000 acres of land in Arizona from the Colorado River. Yet the supplemental report of E. C. LaRue, U.S.G.S., as chairman of the Arizona Engineering Commission, is anything but discouraging to those in Arizona who hope to see 2,000,000 or more acres of land irrigated in the state. Not in the immediate future, perhaps, but it is believed that this will be possible long before some of the irrigation projects in the upper basin states are developed for which they are reserving water under the compact. The compact voiding the law of prior appropriation for beneficial use, sets up bargain terms allotting to the upper basin states seven and one-half million acre-feet of water in perpetuity; and to the lower basin, eight and one-half million acre-feet to be distributed on the basis of prior appropriation for beneficial use unless a supplementary compact is made.

California refuses to sit in a conference with the three lower basin states to make such a supple-

mental compact. As California and Mexico will inevitably develop earlier than Arizona, it is apparent that Arizona cannot accept a bargain allotment in the upper basin and the doctrine of prior appropriation in the lower basin without forfeiting her interests.

I believe that power is the only agency at this time that can bear the cost of development.

One of the main arguments being put forth now is for flood control. The alarm over floods, in my opinion, is exaggerated. During my long residence in Arizona, the only menacing floods have been caused by the simultaneous run-off in the Colorado and Gila Rivers. The Gila River floods, while not fully checked, have had their volume reduced through the several dams which have been constructed so that the flood menace is proportionately relieved.

If power development can proceed unhampered in a businesslike way, the benefits of flood control and more water for reclamation will be realized in a surprisingly short time as a byproduct. Eighty per cent of all the power developed in the lower basin will be developed wholly within the State of Arizona, and the other twenty per cent will be developed between the states of Arizona and Nevada. I believe that this development can be best undertaken by the State of Arizona, and that the state can derive greater benefit and furnish power at less cost than can be furnished through any agency. As the power will be developed in this state, Arizona should determine where it shall be developed in order to be of the maximum benefit to her.

I recently suggested a conference between the states of California, Nevada and Arizona, in order to arrive at an understanding between the states in the lower basin.

The Governor of California refused to appoint delegates to such conference, and the State Engineer of California, who was the California representative at Santa Fe, stated in a letter to the Governor of Nevada, that the upper states were entitled to share in the benefits of any power which might be developed in the lower basin because of any moneys spent by the federal government. I believe it to be the almost unanimous sentiment of the people of the State of Arizona, that—irrespective of the opinion of the State Engineer of California and whatever may be the opinion in the upper basin—the upper basin states will not be entitled to derive any revenue from power developed in the lower basin.

While these objections exist, I do not believe that Arizona will enter into the Colorado River compact.

Advertising for the Central Station

By Theodore Watson

Service Manager,

Johnson-Ayres Company, Advertising Specialists, San Francisco

THE two previous articles have thus far covered briefly the factor of public and official attitude as they affect central station advertising, and given examples of how some companies have met, through advertising, situations involving unfavorable public and official attitude.

Next on the list of factors affecting utility advertising is "proportions of business to be developed as between industrial and domestic." In other words, how much of the central station's advertising "pressure" should be applied to the industrial market and how much to the domestic market?

Obviously, the answer depends on the possibilities for development in each market and then an accurate appraisal of what it will cost to achieve the development. The power company must employ its promotional funds in directions from which the most can be returned. Otherwise the cry of "extravagance" and "willful waste" is apt to be raised. After a market has been gaged and cost of development appraised, the question "Is it worth it?" must be answered.

None of these questions should be answered by guess nor possibilities gaged entirely from surface conditions. Careful surveys and investigations have revealed and continue to reveal surprising facts. Getting the actual facts is very important to utility executives. A simple study of its own records, revealed to one complacent company the surprising fact that considerably more than one-third of its domestic meters were registering less than minimum, minimum, or only slightly over minimum current consumption. Here was a condition demanding attention. As this company served a community made up of farms and small cities, the domestic market offered the greatest field for development. A recent favorable consumer rate made it possible to push the portable electric heater principle, and to institute direct by mail advertising on electric ranges and water heaters to its farmer customers. It was also found that too few appliances were in use by these customers. The advertising was shaped accordingly.

Investigations by questionnaires to consumers, through a third party, are very prolific of results. These should be so planned as not to appear to be sent out by the power company. From the answers and between the lines can be discovered many an unsuspected situation or condition, or a preconceived condition affirmed or proved false. This is provided the questionnaire is skillfully planned. House-

CENTRAL Station advertising, in its conception, strategy and execution, is like that of any other producer of salable goods. Executives are likely to say, "But my business is different." So it is. But it must be remembered that the consumer still continues to be the same old human being. This is the last of a series of articles on this important subject by Mr. Watson.

to-house and factory-to-factory investigations prove valuable for getting a line on the possibilities in the domestic and industrial markets, and for spotting sales barriers.

Investigations brought out the now generally-recognized condition that home kitchens are very inadequately illuminated and that by selling the house-

wife on the comforts and advantages of good kitchen lighting, the central station can profitably increase its domestic load.

Frequently such surveys reveal wholly unsuspected causes for low consumption of current or opportunities for increasing the consumption per meter, or some cause for dissatisfaction on the part of the consumer. Properly-conducted surveys are well worth the trouble and expense.

The subject of investigations and surveys is so big that its possibilities can be suggested only. The important point to remember is that to properly apportion the advertising budget between the domestic and industrial fields, the facts and peculiarities and unsuspected things in both fields have got to be smoked out and studied.

Quite often, the methods of advertising to these two fields are radically different. In the domestic field there is one audience, large and conglomerate. The appeal is to the mass. Hence, the newspapers, street cars and billboards are the logical major media for the advertising message.

In the industrial field there are many audiences, each comparatively small and each having a particular interest. Here the appeal should be separate and very specific. Therefore, as a rule, direct mail, trade papers and personal calls, offer the logical major media for the advertising message. It is true that under certain conditions, the use of direct-mail advertising and personal calls for the domestic consumer, and the newspapers for industrial advertising, is advisable. With these various media in view and knowing the rates and costs for employing them, the central station manager can more readily determine the proper division of his advertising funds between the domestic and industrial fields.

One effective plan for advertising to the industrial field is to divide the various prospects into groups based on common problems in connection with the use of electricity. Campaigns of direct-mail advertising are then carefully planned. As an opening gun, a general folder, booklet, or mailing piece may be sent out, treating in a general way the subject of electricity as applied to the particular group's pro-

ducing or manufacturing problems. Pictures of installations, diagrams and charts are useful items in all mailing pieces, with testimony as to results. Following this first piece, at regular intervals, mailing pieces are sent, each one devoted to describing not more than two actual installations, local if possible. These mailing pieces sometimes take the form of bulletins, and are issued in regular series, numbered and prepared for permanent filing or binding.

It should be remembered that although advertising to industrial prospects is primarily of a technical nature, the recipients are human, and advertising literature can be enhanced in value by injecting in picture and text the elements of "human interest"—also an interesting arrangement of pictures and reading matter. An initial survey will have revealed the particular sales barriers for each industrial group, and each mailing piece will, of course, be planned and worded accordingly. This is a matter of salesmanship in print. Space does not permit of very lengthy discussion of the subject of direct-mail advertising. Many effective plans can be developed by the resourceful central station executive and his advertising and sales counsel. Some companies have taken advantage of local industrial news items and happenings, in building their advertising, both direct-mail and newspaper.

Mention was made of occasions when newspaper advertising seemed advisable in reaching the industries. Some phases of industry embrace a very large number of people directly or indirectly interested; for instance, electric signs, or store, shop and window lighting. Proprietors of shops and stores, big and little, are anxious to hear about better lighting, and proper display of their firm names on their buildings. In addition, every shop girl, salesman, factory

worker, employee of wholesale house, etc., is very much interested in better light in connection with his or her work. And their influence is important. Probably the newspapers reach these combined audiences better and more economically than any other medium.

Pacific Gas and Electric Company has advertised electric signs and store and factory lighting in newspapers with satisfactory results. The company sells

no equipment, but those who do have reported unmistakable results from the company's newspaper advertising. Other utilities have had similar experiences.

Sometimes the situation calls for a general building of good will on the part of the company's industrial customers and prospects. This can be accomplished, perhaps, most readily by proper use of newspaper space. At the same time, injection of the sales angle can be accomplished.

An example of this was the campaign run about three years ago by the United Electric Light Company of Springfield, Mass. Each advertisement was headed "Springfield Industries Served by Electrical Power." One local industry was featured in each advertisement, a brief history was given followed by present day developments. The advertisements ended by stating the experience of these concerns in using electrical power, economies achieved over other forms of power, etc.

All this leads naturally into another factor affecting central station advertising—"Sales and new business departments in connection with advertising."

Well organized sales and new business departments are almost indispensable to the progressive electric utility. Even in fast-growing communities where natural expansion keeps the company busy, there is always a construc-

Newspaper Advertising	Direct Mail Advertising	Commercial Department Activities
JANUARY Kitchen Lighting Also, ask your dealer to show and explain the many convenient and labor-saving devices. Electric Appliances.		Work on dealers to put in displays of kitchen lighting devices, also to run special advertisements. Dress Station's windows—show proofs of advertisements. Get newspapers to solicit dealers for tie-up advertisements.
FEBRUARY Same as January.		Call on consumers, placing all orders through dealers. Keep after dealers.
MARCH Appliances	To farmers on electric ranges and water heaters.	Work on dealers to display and advertise appliances. Use proofs of Station's advertisements, and show mail plan to farmers. Urge newspapers to solicit dealers for tie-up advertisements.
APRIL Appliances or idea of "Electric power to do your work."	To farmers on pumping and motors for chores.	Same as for March, with additional work on motor and farm devices. Explain mail campaign directed at farmer.
MAY 1 large advertisement on what work electricity will do, including odd uses such as egg hatching and chick brooding. 1 large advertisement on proper wiring of homes.	To farmers on electric ranges and water heaters.	Explain to dealers the mail campaign on ranges. Get their cooperation. Work with architects, builders, etc., on proper wiring. Get newspapers to solicit dealers to tie-up with advertising.
JUNE Window and Store Lighting		Work on merchants, shop owners, etc., referring all sales to dealers. Explain to dealers and get their cooperation, with special advertisements and displays of fixtures, etc.
JULY Small advertisements, brief text on "Let electricity do your chores," mostly display, reminder and carry-over stuff.		Keep in touch with dealers. Show proofs of advertisements.
AUGUST Same as July		Same as July.
SEPTEMBER Electric Labor-Saving Appliances	To farmers on motors, washing machines, etc., sweepers, etc.	Work with dealers to get cooperation on special displays and advertising. Show proofs of advertisements and explain mail campaign. Get newspapers to solicit merchants for tie-up advertisements.
OCTOBER Better Home-Lighting Also, bring in Kitchen Lighting.		Work with dealers to display lamps, shades, fixtures, etc. Show proofs of advertisements. Get newspapers to solicit dealers for tie-up advertisements and to run articles on home lighting.
NOVEMBER Electric Portable Type Room Heaters restricted to emergency and short period heating, such as bathroom, etc. Mention electric appliances.		Get dealers to display these devices and advertise them. Show proofs of advertisements. Get newspapers to solicit dealers for special tie-up advertisements.
DECEMBER Electric Appliances as gifts.		Urge dealers to make special displays and run special advertisements. Get newspapers to solicit merchants for special advertising.

Suggested schedule for central station advertising.

tive and educative work to be done. Just because a resident or a factory signs up for service is no indication that either will use this service to the best advantage or use sufficient electricity. The progressive company will keep in constant touch with its customers, to study and advise and help all toward keeping their service efficient and satisfactory. The same company will also advise with new home and factory owners toward securing for them adequate and proper electrical service. All this requires a capably organized force of engineer-salesmen.

This force will also work in conjunction with the advertising, each reinforcing the other. In this way, both advertising and selling efforts are made more productive of results.


How large this sales and new business department should be depends upon local requirements and the opportunities for satisfactory development—conditions which, as stated above, must be determined accurately before plans are laid out.

The usual form of organization combines sales and new business. There generally is a sales manager who has under him sales engineers. In the

larger communities these men are divided into groups, each specializing on some one industry or phase of electric service, such as illumination, electric trucks, electric ranges and water heaters, the enameling industry, etc. In the smaller communities, the manager himself usually takes charge of sales and has one or two men to assist him, none of them trying to specialize, as the field is limited. Carefully planned, systematic schedules of calls are necessarily a big feature in effectual operation of the department. Even in small communities when and where and how and why are exceedingly important.

One of the most important functions of the sales or new business department is securing the cooperation of dealers in electric appliances, and electrical contractors—another factor affecting central station advertising.

Dealers are the outlet through which electricity-consuming devices reach the company's customers. It is obviously much to the advantage of the company to develop these dealers into efficient merchandisers of appliances—the more appliances sold (intelligently sold) the more electricity will be used. It is



Why has the Windmill disappeared?

Consider the windmill. Is it not the ideal source of power? Once installed it produces power virtually without cost. And there is no possibility of exhausting the motive force. The same breeze spins one or a thousand windmills.

Then why has the windmill gone into the discard? Because the power was seldom there when needed. The windmill was typical of the day before electricity. Today we have the magic of the **ELECTRIC CURRENT**—whose **DEPENDABILITY** Electricity is **THERE WHEN NEEDED**.

Translate this horsepower manpower and it was population of the state.

Through its life of almost a century, there has never been a time when Sound Power & Light Company failed to supply the needs of this great section. Today it is just as eager as ever to assist in the expanding needs of the present and the future. Taxes paid by the company this year will approximate \$1,000,000.

At we sell more electricity we are able to sell it cheaper. It is practically the only commodity lower now than it was twenty years ago.

Ten hydro-electric plants, the three largest being White River, Squamish and Electron, supply patrons of the Puget Sound Power & Light Company with 121,230 horsepower of electric energy, while 14,380 horsepower are constantly available in seven powerhouses giving 10,690 horsepower from other sources to contribute to a total of 136,600 horsepower to the right to the working, building forces of the Northwest. Working, building forces of the Northwest extending from British Columbia into Oregon, from the Pacific Ocean eastward to the favored Weather Valley.

If you would like to join hands in this great electrical development, you can share in steady and dependable earnings by stock ownership in the Puget Sound Power & Light Company. Consult the nearest office of the company, any of its 200 offices, or write to the Puget Sound Power & Light Securities Company, Electric Building, Seattle.

Puget Sound Power & Light Company
Tacoma Everett Bellingham Seattle

20% Increase in Production followed Better Lighting

ONE manufacturing concern kept careful records of production before and after the installation of a proper lighting system. Production was proved to increase 20%.

The first picture at the left is a good example of the even distribution of light which every factory should have. Note the absence of shadows.

Direct glare as illustrated in picture number two will slow up any man's work. It is a cosine against human eyesight.

In picture number three the dense shadows actually hide part of the work from the mechanic. Also, of accidents and expense.

How about the lighting in your production and source? Call on the trained lights by the P.G. and E. for recommendations. They will be glad to give you a free estimate.

PACIFIC GAS AND ELECTRIC
A California company serving over 12,000,000 people.

Electrify Now

Address your plan with an electric sign. Ask for a free estimate.

Good Lighting Brings More Business

You pay one-half of your rent, Mr. Merchant for your window space. It is your greatest advertising space. Make it of more value with the right amount of light.

Eighty-two per cent more people stopped to look at a display in a store window after better window lighting was installed.

It is human to go where the lights are bright. People flock to a store that is light, cheery, and attractive. Both clerk and customer are better satisfied. A 25% increase in sales per customer has been known to result from improved illumination.

The most industrial lighting medium to your dealer or to the local P.G. and E. office. Let trained, P.G. and E. lighting specialists give you advice on better window and store lighting.

PACIFIC GAS AND ELECTRIC COMPANY
A California company serving over 12,000,000 customers of electricity.

P.G. and E.

"PACIFIC SERVICE"

ELECTRIFY NOW!
Are your show cases lighted? Ask for a free estimate.

PUBLIC LIBRARY

Only \$15.00 Down

An Unusual Range Offer You Cannot Afford to Overlook

Till June 15 Only

Reduced Price and Easy Terms

This unusual sale of Westinghouse Automatic Electric Ranges includes the following advantages:

- 1—Range installed complete at reduced price.
- 2—Lowest down payment we have ever offered.
- 3—Special easy term payments on balance.
- 4—Free with each range an Aluminum Four-piece Cleverest Cooking Set—value \$6.00.

The Range That Watches the Clock

You wouldn't need to hurry for fear things would be burned and spoiled.

You wouldn't need to have the roast or the bread on your mind every minute until it was out of the oven.

The **WESTINGHOUSE AUTOMATIC ELECTRIC RANGE**.

"The Range With the Clock" watches the time for you. Turns the heat on and turns it off at just the right moment.

Come in and let us show you.

Ask for FREE Demonstration

Glad to Show You Any Time

The Range With a Clock Makes Home Life Happy

Electric Store
Alder Near Broadway
Portland Railway, Light & Power Co.

Only \$15.00 Down

Better Cooking

Friends of your own with electric ranges will tell you that electric cooking with controlled heat gives better results, and does it more cheaply.

Hundreds and hundreds of our subscribers revelling in this modern clean way of house-keeping, have no untidy wood or coal fires to tend—and say it would be cheap at twice the actual cost.

Let us convince you of how surprisingly low the average bill runs—from the current monthly statements in our books.

Ask about the special combined rates for cooking and lighting at our local office. See the electric ranges today at your electrical dealer. You can get one on easy payments stalled immediately.

THE CALIFORNIA OREGON POWER COMPANY

Electric Service Is a Blessing on Washday

No longer is the housewife dependent on the maid, laundress or laundry. No longer need the weekly washing mean a day of unbroken drudgery, of steam tubs and boiling suds.

Electric Washing Machines

Now do the hard, unpleasant work and do it more quickly and far better than the most painstaking hand method.

We sell Thor, Eden, Maytag, "1900" Cateret and Western Electric Washers—a washer for every pocket-book.

Let us show you how one quickly pays for itself.

Tel. Marshall 5100

ELECTRIC STORE
Portland Railway, Light & Power Co.

The Servant Problem and the Solution

Electric Service affords the simplest and most practical solution of the servant problem. Don't worry because you can't get a maid who will do the washing. Don't fret because there is a scarcity of laundresses. Equip Your Home With an Electric Washing Machine

With this machine you can easily do the weekly washing yourself in less than half the time required by the laundress.

An Electric Washing Machine washes with far less wear and tear on clothes than is possible by hand.

Five cents or so for electricity usually covers the cost of our service.

Drop in at our **ELECTRIC STORE** today and let us show you.

Telephone Marshall 5100
Portland Ry., Light & Power Co.

Residential consumers are reached by advertisements of this character.

astonishing how many more appliances can be sold by the live merchant who understands how, than by his neighbor who is indifferent and simply takes what comes his way. All dealers should be made to feel that the company's sales advertising is being done to **help them**. They should be taught how to cash in on the sales advertising by co-ordinating their store and window displays and using advertising space of their own tie-in with that of the utility. They should be taught how to put on demonstrations and how to sell the particular appliances they carry. They should be sent advance proofs of all newspaper advertising and helpful suggestions through the mail from time to time.

This type of dealer work requires men who are salesmen and merchandisers as well as central station men. They should understand the dealer's viewpoint and be able to talk to him in his own language. Should the utility also retail appliances, this cultivation of dealers is needed more than ever. Most dealers are inclined to resent the competition and those central stations who do not retail and have definite policies in this regard seem to secure the largest measure of dealer cooperation. There are,

however, two sides to the question of retail selling of appliances.

In dealer cultivation, the wholesaler should not be overlooked. He welcomes the help of the central station in making better merchants of his customers and can be of material aid.

The policy and plan of the Commonwealth Edison Company of Chicago pertaining to dealers is interesting. Quoting from a recent letter from this company:

"In the merchandising of electrical appliances, we extend to them (the dealers) the same privileges and advertising accorded our own Electric Shops, especially in the sales of the larger appliances such as the electric washer and cleaner. These appliances the dealer sells on the same deferred payment plan, the payments for same being spread on our monthly light bill, the dealer receiving his profit on the sales of these appliances after credit has been established, our company assuming the contract and the monthly collections. This does not require the dealer carrying a large stock thereby tying up his capital.

"The dealer also, if he wishes, may obtain for his store a bill paying station. He may also give and redeem a profit-sharing coupon under the same plans in effect in our own

Electric Shops. This coupon is exploited by our company to assist the retail merchants particularly in the outlying districts to advertise their business and to also stimulate the attendance at the different Electric Shops.

"In addition to this, we assign for their exclusive use a sales promotion salesman who visits their shops regularly to induce their interest in electrical merchandise particularly in their local field, and in this connection they are furnished card writing service and window trimming service free.

"In the manner briefly outlined, our company is endeavoring to assist the local contractor-dealers to build up their several businesses and the community in which they operate."

Now, in the case of contractors, it is a problem, at least on the Pacific Coast, to secure their full cooperation toward adequate wiring, proper store and shop lighting, and merchandising of heavy appliances such as ranges.

A recent investigation showed that practically all merchants, large and small, were alive to the importance of proper store lighting, but were at a loss to know to whom to turn for advice. At the same time, the manufacturers of lighting fixtures, materials, lamps, etc., were supplying the contractors and dealers both, with the most complete literature on lighting for all sorts and types of stores and shops. This literature is prepared by recognized engineer-specialists and contains exceedingly valuable data.

Apparently, these data—the very information the merchant and shop owner is eager to get—stop and pile up in the office of the contractor or dealer. As a result the central station is obliged to step in, break the jam, and create a connection between the contractor-dealer and the prospective customer by endeavoring to show the former how to merchandise his wares and knowledge, and the latter how and where to secure the lighting counsel he seeks.

The question of adequate wiring seriously affects the sales of electric ranges and other heavy appliances. Electrical contractors and even architects must be educated to cooperate in having new homes wired for all future electrical requirements, even to the extent of complete space-heating by electric energy.

Another feature of the plan of the Commonwealth Edison Company in their work with contractors and dealers, is described as follows:

"Once a month we hold a joint dinner meeting at which the company representatives engaged in the merchandising branch of our business meet with the contractor-dealers and matters of mutual interest are discussed, all the expenses of same being borne by this company."

One of the medium-sized power companies of the West serving four small cities and intervening farm territory has worked out a well-co-ordinated plan of advertising and dealer sales work. It was first decided for each month in the year, what definite appeal the newspaper advertising should take, considering conditions and reasons. After this schedule of what to advertise and when, was laid out, its "bare spots" were covered by specially planned direct-mail advertising. For instance, the newspaper schedule called for the advertising of the lighter appliances during certain months. This did not provide for

featuring electric ranges and water heaters because the company also sells gas in the towns, and did not want to jeopardize its gas investment by pushing electric cooking and heating. But the farmer-customer was not interested in gas and made a logical and excellent prospect for electric ranges and water heaters. Therefore, a special mail campaign was planned to reach him during certain months when appliances were the subject of newspaper advertisements.

Other direct campaigns were planned and the two schedules—newspaper and direct-mail—joined in one co-ordinated schedule. Then the activities of the sales department were planned so that the interest of the dealers would coincide with the subjects being advertised, the results aimed at being proper displays, local advertising, and sales efforts on the part of the dealers, all paralleling the advertising effort of the company. The accompanying table visualized this excellent plan.

Outdoor advertising would have been also very effective for this campaign, copy being planned to parallel that of the newspaper copy. The appropriation, however, was not large enough to allow both, and it was decided that the newspaper advertising was of more value. It should be mentioned that a part of the activities of the sales department was inducing the newspapers to devote a department—perhaps on the household page—dealing with electric appliances and their use, proper lighting, etc. The central station should, in these cases, be prepared to furnish the newspapers with suitable material.

Some central stations have successfully used an advertising appeal which combines the institutional or purely good will with the sales-making. This blending likens itself more to the institutional, however, and should not be confused with the out-and-out sales advertisement having the institutional flavor.

A good example of this type of advertising is the series used by The United Electric Light and Power Company of New York City. Each of these advertisements features a prominent building to which the company serves electricity. An attractive pen and ink picture of the building is shown while the text of the advertisement gives a brief description of the structure, its location and the names of architect, builder and electrical contractor. The advertisement ends with a paragraph stating that the company is ready to serve efficiently all requiring electricity.

This subject of advertising for central stations is so big and so much can be and should be said, and space so limited, that generalities and outlines have necessarily made up the bulk of these articles. It is hoped that some thought, some constructive idea, may reward the reader for his effort in following the series. As a parting thought—central station advertising, in its conception, strategy and execution, is like that of any other producer of salable products. You often hear the plea, "But my business is different." Of course it is. But, to quote a prominent national advertising man, "Remember, the consumer still continues to be the same old human being."

Installation of Identified Conductors

By Claude W. Mitchell
Electrical Engineer, Board of Fire Underwriters of the Pacific,
San Francisco, Calif.

IN the October 15 issue of the Journal of Electricity an article on the protection of branch circuits called attention to the necessity of identifying neutral conductors. Since the publication of that article a large number of copies of the new National Elec-

grounded, the ground connection shall be made to this identified wire.”
As pointed out previously, compliance with this rule will prohibit using this white or identified wire for all conductors of a circuit. In approved armored

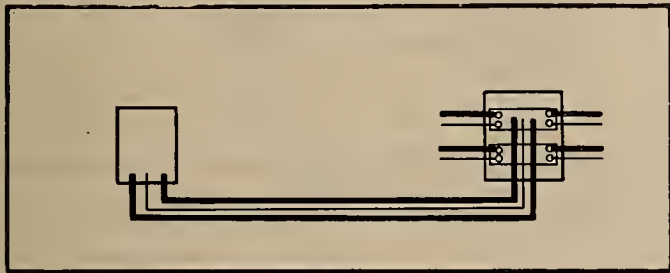


Fig. 1.

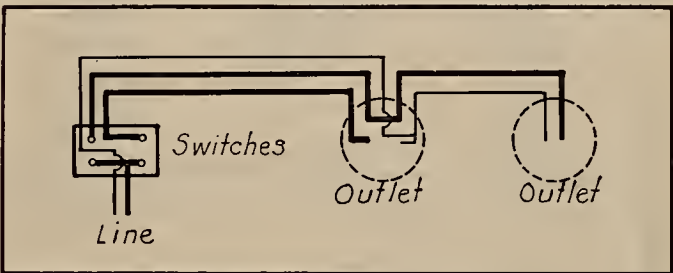


Fig. 5.

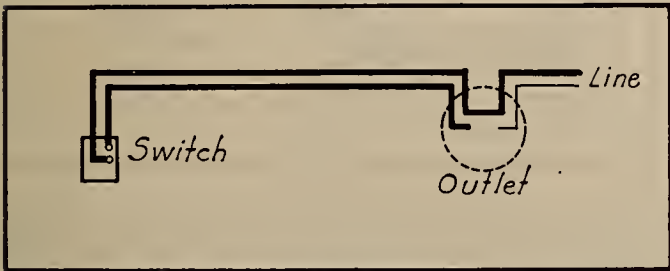


Fig. 2.

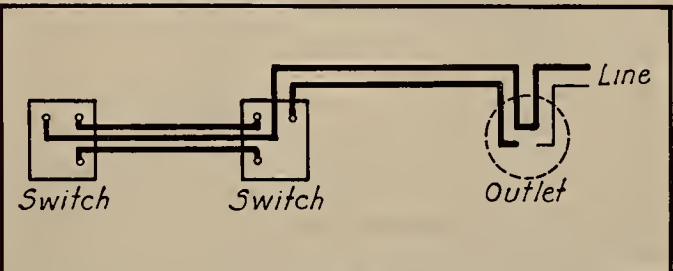


Fig. 6.

trical Code have been distributed and so many of the recipients have asked for interpretations of the requirements that it has been deemed advisable to present a few diagrams showing proper methods of using the identified conductor.

The rule relating to the subject is found in Section 601-b of the new Code and reads as follows:

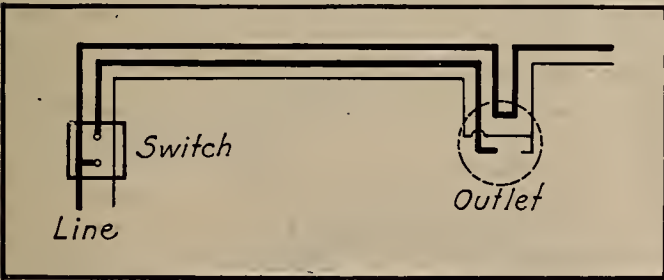


Fig. 3.

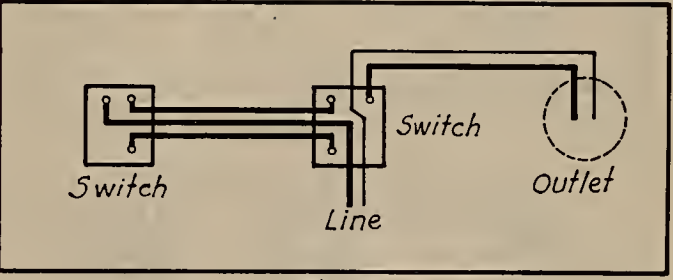


Fig. 7.

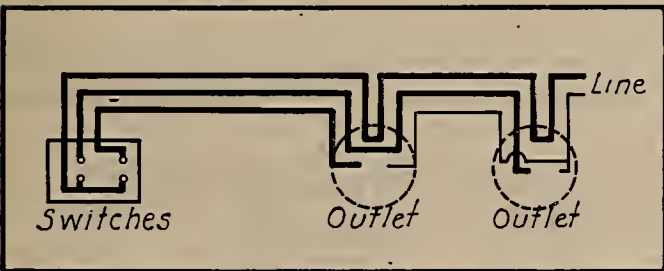


Fig. 4.

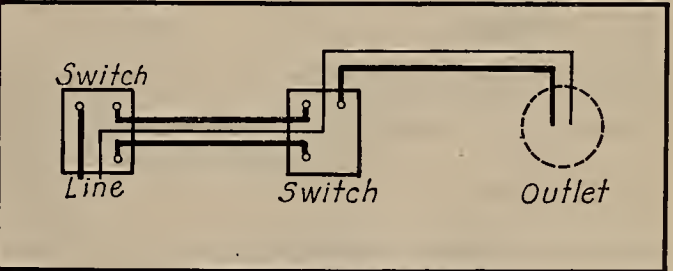


Fig. 8.

“For conductor sizes No. 8 and smaller the neutral conductor on all 3-wire circuits and one conductor on all 2-wire circuits shall have a continuous identifying marker readily distinguishing it from the other conductors. For rubber-covered wire the identification shall consist of a white or natural gray covering. When one of the circuit wires is to be

single pole switches shall not be placed in the identified wire. Also, three-way switches shall be classed as single pole switches, and shall be so wired that only one pole of the circuit will be carried to either switch. The proper methods of connecting single pole switches are shown in Figures 2, 3, 4 and 5 when single conductors are used and in Figures 10,

Note—Heavy lines in figures denote the black covered or live wires. Light lines denote identified or grounded wires.

11, 12 and 13 when armored cable or twin wires are used. Correct methods of connecting 3-way switches when using single conductors are shown in Figures 6, 7, 8 and 9 and when using armored cable or twin wires, in Figures 14, 15, 16 and 17.

Due to the fact that armored cables and twin wires contain one identified wire it will be noted

which it may be readily distinguished. The marked wire shall be in all cases the grounded wire." The last sentence means that this marked terminal shall be connected to the identified circuit wire at the fixture outlet.

Adherence to these rules of the Code will minimize the possibility of harmful or dangerous

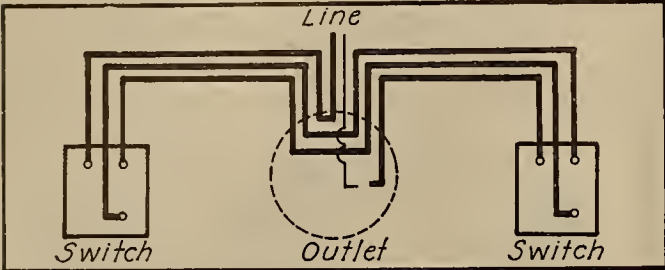


Fig. 9.

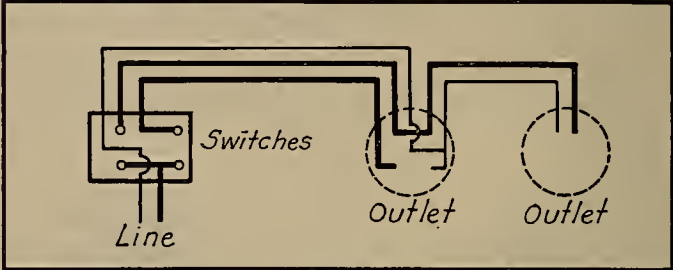


Fig. 13.

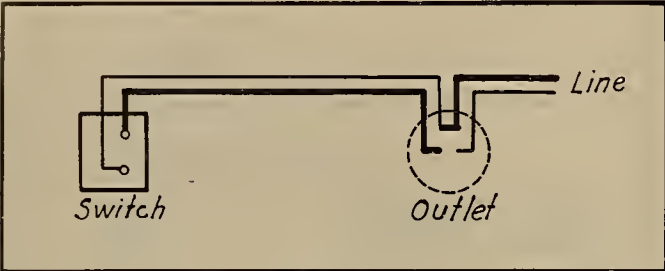


Fig. 10.

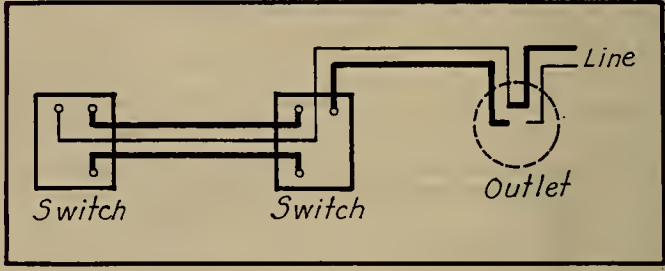


Fig. 14.

where either is installed that at the switch there will be one black and white covered wire as in Figure 10, instead of two black covered wires where single wires are used as in Figure 2. It will be noted, also, that

shocks. Connecting the screw shells of sockets to the grounded wire places these shells and the exposed bases of lamps which are being inserted practically at ground potential. Also, with the single pole switch

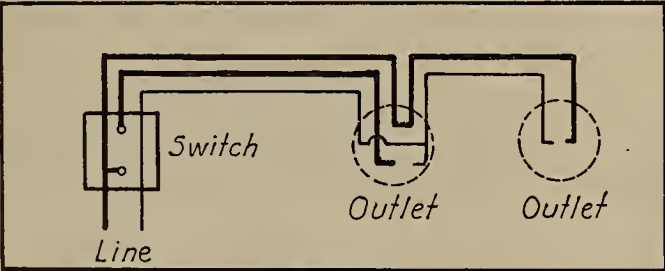


Fig. 11.

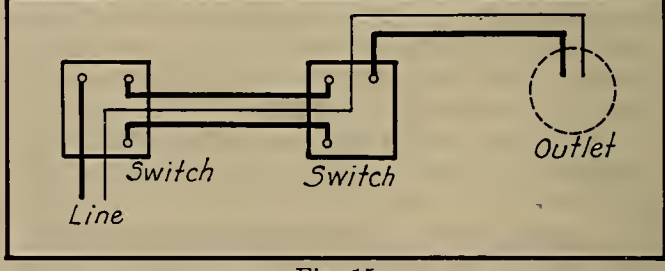


Fig. 15.

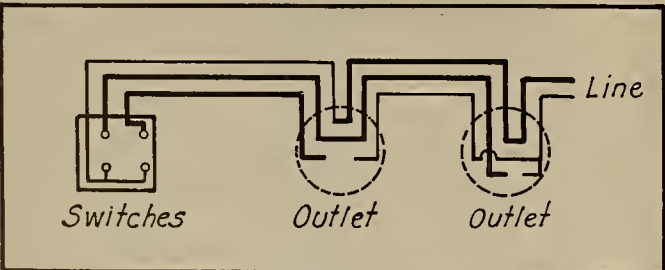


Fig. 12.

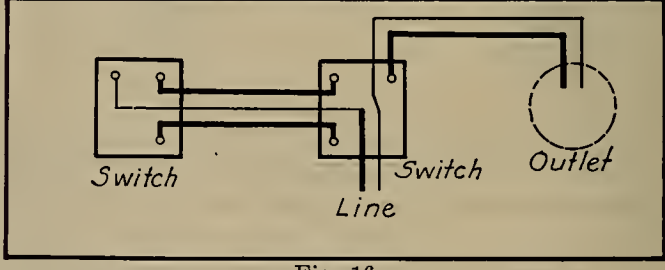


Fig. 16.

at each outlet, regardless of the type of construction, one, and only one, of the terminal wires is the identified conductor, and that this is **not** the one coming from the switch. Care must be taken in armored cable or twin wire installations to insure this condition at the outlet as it is necessary for the proper connection of fixture leads.

For Fixtures

Section 1402-b requires that, "each fixture shall be so wired that all screw shells of sockets will be connected to the same fixture stem wire, or supply wire, or terminal in the fixture, and this wire or terminal shall be marked in an approved manner by

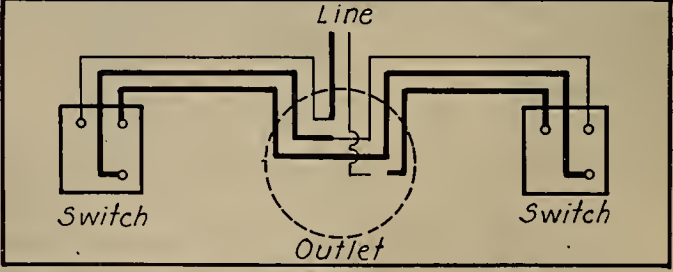


Fig. 17.

in the live wire of the circuit no part of the fixture wiring is above ground potential when the switch is open. Therefore the possibility of shocks is almost entirely eliminated.

Problems of the Manufacturers' Agent

By E. A. Kincaid

Associate Professor of Commerce, McIntyre School of Commerce, University of Virginia

SEVERAL references have been made to the tendency of the manufacturer to eliminate the manufacturers' agent from his system of distribution. While this is one of the serious problems with which the manufacturers' agent has to contend, it is only one of those which it is now proposed to consider. The manufacturer may be disposed to open a factory

branch. Let us consider this one first. There are several factors which may induce a manufacturer to take this step.

I. He may want more precise and exact control of the processes by which his goods move to ultimate consumers. The more steps controlled by the manufacturer, in the process by which goods move in the channel that leads to the consumer, the more definite is his control. The advantages of such control are many, and the chief obstacle in the way of realizing this desired end is the cost of obtaining it. The cost of more exact control on the part of the manufacturer is the chief reason for the disposition to use manufacturers' agents. The leading instigator of such a step, that toward elimination of the agent and substitution of the factory branch, is the general sales manager of the manufacturer. He is the one who most accurately senses the lost motion, the waste and inefficiency that comes from a distributive system dominated by independent middlemen. There is a good deal of common interest on the part of distributors and manufacturers, but there are also forces that make for divergence of interest. Whenever the latter appear to predominate, the manufacturer is ready for consideration of a change in the processes by which his goods reach the market. The only certain way that middlemen have to assure their perpetuation is through the elimination of the factors that make for divergence of interest. The less there are of these the less the manufacturer will be inclined to consider innovations in his marketing methods. To deter the sales manager from taking steps to open a factory branch the manufacturers' agent must reduce to figures which do not lie the relative costs of the two methods. A manufacturer is open to reason in terms of costs in dollars and cents.

II. A manufacturers' agent may be a poor sales manager and thus fail to get distribution for the products of those whom he represents. This is a not infrequent explanation of the disposition of the manufacturer either to eliminate manufacturers' agents from his market methods or to transfer his business to another agent. Competitive conditions in

WHAT justifies the existence of the manufacturers' agent in the electrical field? Is his position vital in the distribution of electrical products? Will he continue to be a necessary factor in the scheme of distribution? These are some of the questions which Mr. Kincaid answers in this article of the series which he is writing on the distribution of electrical products on the Pacific Coast.

Pacific Coast territory are such that only a wide-awake agent can hope to survive. He must function 100 per cent. To survive he must comprehend a multitude of intricate situations. He must know where the business is and go after it. A sales manager is essentially an organizer, a planner and a strategist. He must be able to select real salesmen and

devise a system of following up their activities. He must be able to see his market as a whole and then to analyze each separate district in terms of its peculiar problems. He must keep informed as to the activities of his competitors and the possibilities of his market. A sales manager is a general and a statesman combined. He must be a thinker who can think in terms of a problem which he can visualize as effectively as if it were close at hand instead of in some remote part of his territory. The writer met some manufacturers' agents in Pacific Coast territory who have all of these qualities. They are going ahead steadily and giving the manufacturers' agent a real and honorable status in the electrical field. Where such men are at the helm manufacturers are not contemplating changes.

III. The manufacturer may feel strong enough to get the support and cooperation of jobbers without the assistance of a manufacturers' agent. When this situation exists there are certain inherent factors that make it possible. In the first place, the manufacturer may have a highly standardized and widely advertised product or line. In the next place, he may have the resources to finance a long adverse pull that may follow upon any change in methods of distribution. He may have in his line some, one or more, products which are much needed to fill out the jobber's stock. He may have a line or product for which there is no serious competitor, or in other words, a product that he alone can supply. His manufacturers' agency may have failed utterly to sell his own organization when he sold his manufacturers' line. Thus it may come about that the manufacturer can hold the jobbers by means of his line, where under other conditions to cut off the manufacturers' agent would mean the loss of the jobbers' good will. Under such conditions the manufacturer may feel strong enough to eliminate the manufacturers' agent and go direct to the jobber from his own factory branch.

Another problem confronting the manufacturers' agent has to do with the possibility that his principal may reduce commissions. Just what the commission shall be is ordinarily set forth in the

original agreement and it varies, in practice, with the lines handled and the nature of the service that the agent is to render. In some cases the commission has been placed at 20 per cent of sales and has then been reduced as the volume of sales has expanded. Some manufacturers' agents admit that such a practice is entirely proper since the services rendered are no longer so arduous, while the aggregate compensation will be even more, the volume of sales expanding more rapidly than the rate of commission declines.

It must be clear that agents cannot insist upon a commission rate which will tend to encourage the manufacturer to shift to a factory branch or sell direct to the jobber. Hence the rate of commission becomes a matter of policy.

The manufacturers' agent also has the problem of getting and holding a good and well balanced group of products. Upon the proper solution of this problem will depend his own cost of operations and his volume of sales. It is important to the agent that he shall represent a strong house with sound policies. He prefers a manufacturer with a line that is standard in every respect and it will, of course, mean much to the agent if the manufacturer conducts nationwide advertising of his products. The agent realizes that he must start with a product that will hold its place in the market in the face of competition resulting from the coming of improved goods. Hence if he selects only high grade products, he need not fear that his labors in developing a market will have been wasted. In other words, the product will have been worth all the effort expended on it. Ordinarily these two problems go together—getting the proper lines to handle and the best houses or manufacturers. A good house ordinarily means a high grade product, though it often happens that an obscure house puts out high grade goods.

Need for Educational Work

There is need for a vast amount of educational work in behalf of some lines, partly to counteract prejudice of jobbers or other buyers, and often to overcome the tendency to adhere to lines that are "sold" to the public through advertising and equally well "sold" to the trade. There is less sales resistance for such lines, and jobbers stick to them on that account even though some less well-known product may be superior. At any rate, it is the business of the manufacturers' agent to cultivate the market and bring home to jobbers and dealers, to engineers and architects, and to purchasing agents of corporations the merits of his lines and the advantages that will accrue if they are specified. Thus by a process of attrition a manufacturers' agent may gradually eat in on the demand for some well-known product and find a place in the sun for the output of the manufacturer whom he represents. The thing has been done times without number and it will be again. Certain manufacturers' agents will say that the market is dominated by certain big producers or certain big jobbers, but even while they talk, other agents are at work skirmishing for business and getting it. While getting it, they learn how to get more. There is always a place for the small manufacturer with a

good product, and there always will be. It is not always the large manufacturer or the large jobber that has the lowest cost per unit of business done, and so long as this is true there will be effective competition for the big concerns.

It is said that eastern manufacturers sometimes make unreasonable demands of their agents in Pacific Coast territory. These demands arise from the fact that the manufacturer is without information as to trade practices, customs and conditions in the territory. It therefore falls to the lot of the manufacturers' agent to carry on educational work in two directions. In the first place, he must educate the manufacturer whom he represents. In the second place, he must carry on educational work which will enlighten the jobber or dealer or other buyers of his lines. But the former is of a somewhat different sort in that it involves the process of enlightening the manufacturer as to the characteristics of the market in which his agent is operating and what may reasonably be expected of that market as to volume of sales, terms of sales and related matters, transportation problems, credit risks, and business conditions. The position of competitors and their methods are also matters concerning which the manufacturer stands in need of enlightenment.

Varieties of Manufacturers' Representatives

This discussion must not be concluded without a word about the several varieties of intermediaries that stand between the manufacturer and the jobber or other distributor.

I. For the most part, this discussion has had to do with what may be described as the typical manufacturers' agent. Such an agent represents lines produced by several manufacturers and he sells the lines as he may, on a commission basis. Generally speaking, these lines are closely related to each other so that, taken as a whole, they give the salesmen of the manufacturers' agent a fairly good opportunity to supply some need, to take some sort of an order, upon the occasion of each call made. Such an agent may have but one office from which he handles the business of a territory within a considerable radius.

II. Other manufacturers' agents have all of the characteristics of this first and most typical sort; in addition, they have branches. Thus one meets with manufacturers' agents who have head offices at San Francisco with branch offices at Los Angeles, Portland and Seattle and perhaps at other points. Such an agent will be able to cover a much larger territory, and such an organization of his territory is needed, if his contract covers the Pacific Coast territory as the term is used in this series of articles. Where such an organization of the territory prevails, salesmen work out from the branch offices and thus are able to cover each region within the territory with greater intensiveness.

III. Either of the first two types may carry consigned stocks in a warehouse, and thus we have a third type created by adding this function to the service rendered by either of the other two. Where this practice prevails the title to all goods remains in the manufacturer, but the agent disposes of them

on commission under such conditions as he may find most satisfactory. It is obvious that the warehousing function thus undertaken may make it possible for the manufacturers' agent to obtain business and establish relations that would otherwise be impossible.

IV. While speaking of the warehousing feature of the manufacturers' agent's activities, it may as well be explained that some of these intermediaries maintain stocks sufficient to supply jobbers as they may need goods. Thus we have a fourth variety of the general species, and this variety is not so different from still another, the manufacturers' agent who carries a comparatively small stock. The intent of such a service is to provide nothing more than an emergency stock, and this is often highly expedient because of the remoteness of many jobbers from the factory. Often the jobber suffers a loss of business because he cannot fill orders until goods arrive from the factory. Here the manufacturers' agent may step in with his emergency stock and thus aid the jobber, the dealer and the consumer.

V. In addition to these types or varieties of manufacturers' agents, there is the direct factory representative who gives all of his time to one manufacturer and to that one alone. He may be regarded as a salesman serving under the general sales manager at the factory but serving at some outpost of the market until a more comprehensive method becomes advisable. Generally he works on a salary basis, but he may receive both a commission and a salary just to insure greater vigilance in getting new business and holding up the volume of the old. Such a representative differs but little from the technical engineer who handles, for the factory, certain highly specialized engineering products which call for specialized knowledge and just as specialized selling ability.

VI. Reference may also be made to yet another and but slightly different functionary, the sales agent who really acts in the capacity of the manufacturers' own sales department in the particular locality where he serves. He is one of the numerous eyes of the factory sales department and at the same time an outlet for goods via such channels as may be available. He differs from the factory representative in that his contract may not call for exclusive representation.

Thus it appears that economic conditions have created several shades of the general type known, for the purposes of this discussion, as the manufacturers' agent.

Conclusion

In summation of what has been said concerning the very interesting and important intermediary between the manufacturer and the jobber or other distributor of electrical goods—the manufacturers' agent—let it be said that

- I. He is in the field because he performs important economic services.
- II. Not only that, but he performs them more cheaply than those manufacturers who use him are in a position to do.

III. He is something more than one of the factors through whose hands goods may move, for he is a sales promoter, a business scout, a sort of light cavalryman, who is able to get business here, there and everywhere in the face of all sorts of conditions.

IV. He is an educator of manufacturers and jobbers, dealers and consumers. He knows more about general market conditions than any other factor in the distribution of electrical goods. He can tell more about the way business is being done and why it is being done than any other element in the trade.

V. He is probably best informed concerning the strength and weakness of a given manufacturer's line, concerning the strength and weakness of the manufacturer's methods, the jobbers' marketing and merchandising abilities and the facts concerning the contractor-dealer problem.

VI. He is in the game and he is there to stay for many years to come, so far as the Pacific Coast territory is concerned. This is true for several reasons. Most of them are inherent in the fact that the Pacific Coast is remote, not so much in miles as in knowledge in the possession of manufacturers. Out of this situation arises other explanations for the existence of the manufacturers' agent in the electrical field. Thus it comes about that he must supply the trade information that is so essential to the process of breaking down the sense of remoteness that characterizes so many eastern manufacturers who do, or hope to do, business on the Pacific Coast. The fact that centers of consumption are so scattered and distances are really relatively great, in terms of trade conditions, will make it necessary for some manufacturers to make use of these agents for many years. The hope of a volume of sales and a certainty of a place in the market cannot, for many manufacturers, become sufficiently tangible to make it possible to displace this intermediary.

Most important of all the factors here involved is this one—the manufacturers' agent is the best and surest dependence of the newly organized factory, of the new and struggling manufacturer whose plant is relatively small and whose output is of corresponding size and range. There is no reason to suspect that the day is at all near at hand when new manufacturing enterprises will cease to come into being. Such a day is certainly no nearer than the day when new inventions of electrical specialties of all sorts will cease. Those most familiar with electrical science hesitate most to make predictions as to the future of the industry. The limits within the field are absolutely unpredictable. This being the case, new devices of all sorts will continue to appear and corporations will be formed to manufacture and distribute them. Such corporations must sell to survive, and to them the manufacturers' agent is now and must long continue to be essential.



Electrical Construction

By E. Earl Browne

THE term "Industrial Lighting" covers an infinite number of classes of users of artificial illumination, and as in general the class of equipment and methods of installation of both wiring and fixtures are similar for a certain use, it becomes simply a problem of ascertaining the use to which the different sections of the building are to be put and proceeding in accordance with certain recognized standards; i.e., in packing plants, etc. The cold

glycerine, with all pipe outlets at fittings filled with a compound which will not melt at less than 140 deg. F. In certain acid and chemical plants the use of steel conduit is a waste of money and all conductors should be supported on insulators secured with brass or copper screws and bolts.

In vegetable oil plants the use of rubber covered wire is a source of continual expense and in these

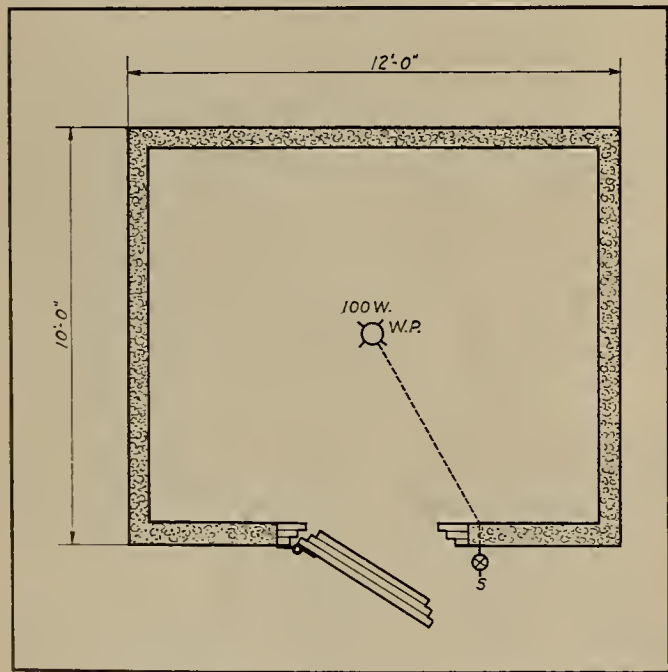


Fig. 1—Wiring diagram for cold storage room.

storage rooms should have all work done with galvanized or sherardized or brass conduit and fittings and lead encased rubber covered wire, and all fixtures should be of the waterproof type with enclosing globes, and if there is any likelihood of breakage they should be equipped with brass guards. The switches for the control should be in the passageway (Fig. 1) and a receptacle and a ruby pilot lamp should be placed above the switch so as to show whether the lights in the rooms have been extinguished.

In plants such as dyeing and cleaning works where gasoline and other explosive vapors exist, the installation should consist of vaporproof receptacles and globes and the entire conduit installation should be put together with red lead and oil or litharge and

Table of Foot-Candle Intensities Recommended for Different Classes of Service

	Minimum Intensity	Desirable Intensity
Assembling		
Rough.....	.1	2 to 6
Medium.....	2	3 to 9
Fine.....	3	4 to 12
Extra Fine.....	5	10 to 50
Bakeries.....	2	5 to 10
Boiler Rooms, General.....	.5	2 to 4
Pumps, Condensers and Apparatus.....	1	4 to 8
Candy Making.....	2	5 to 10
Canning and Preserving.....	2	5 to 10
Chemical Works.....	.5	1 to 9
Construction		
Outdoor.....	.25	1 to 4
Indoor.....	.5	2 to 6
Dairy Products.....	2	4 to 8
Drafting Rooms.....	5	10 to 50
Electric Manufacturing		
Storage Batteries.....	2	4 to 8
Coil Winding, Mica Working, Insulation.....	3	6 to 12
Lamp Manufacturing.....	5	8 to —
Elevators, Freight and Passenger.....	.5	3 to 6
Forge Shops and Welding		
Rough.....	1	4 to 8
Fine.....	2	6 to 12
Foundries		
Rough Moulding, Cleaning.....	1	3 to
Fine Moulding, Core Making.....	2	
Glass Works		
Mix Rooms, Furnace Room.....	1	
Grinding, Blowing, Cutting.....		
Fine Grinding, Deco- Cutting, Inspection		
Glove Manuf.....		
Halls, S.....		
Ice.....		

Table I.

locations varnished cambric insulated conductors should be used.

In flour mills all apparatus should be so installed that it can be readily cleaned, as the continual gathering of dust in switch cabinets, etc., is a source of danger whereby the entire plant may be wrecked should a sufficient quantity accumulate and explosion result.

All wires for boiler gage and water column lights should have a slow-burning (Type S.B.) insulation, as the use of this is permitted for open work under Rule 26-g of the 1920 National Electrical Code and in conduit work under rule 26-n.

TABLE II

	Foot- Candles Recom- mended	Under Some Con- ditions
Armories, Public Halls.....	5	3-5

	Foot- Candles Recom- mended	Under Some Con- ditions
Pneumatic Tire Building and Finishing	10	6-15
School:		
Assembly Room	5	4-6
Class Room, Study Room.....	8	5-10
Cloak Rooms	3	2-4
Drawing Room	15	10-20
Laboratory and Manual Training	10	8-12
Sheet Metal Works:		
Miscellaneous Machines, Bench Work	8	6-10
Punches, Presses, Welders, Fine Bench Work	10	8-16
Tin Plate Inspecting.....	15	10-20
Shoe Manufacturing:		
Hand Turning, Miscellaneous Bench and Machine Work.....	8	5-10
Inspecting, Sorting, Cutting, Light Goods	10	6-12
Inspecting, Sorting, Cutting, Dark Goods	20	10-50
Soap Manufacturing:		
Kettle Houses, Cutting, Soap Chip and Powder.....	5	3-6
Stamping, Wrapping and Packing	6	4-8
Steel and Iron Mills, Wire Product:		
Soaking Pits and Reheating Furnaces	2	1-3
Charging and Casting Floors.....	3	2-4
Heavy Rolling, Shearing, Pick-irg, Cleaning	4	3-6
Automatic Machines, Light and Cold Rolling, Wire Drawing, Shearing by Line	6	4-8
Storage and Stock Rooms:		
Rough (no labels).....	3	2-4
Medium	6	4-8
Fine	8	5-10
Stores or Departments in Large Stores:		
Art	8	5-10
Automobile Supply	6	4-8
Baker	6	4-8
Book	8	5-10
Butcher	6	4-8
Carpet	8	5-10
China	6	4-8
Cigar, Tobacco	10	8-12
Clothing	8	6-10
Confectionery	6	5-8
Dairy Products	6	4-8
Decorator	8	5-10
Drugs	8	5-10
Dry Goods	8	5-10
Electrical Supplies	8	5-10
Florist	6	4-8
Furniture	6	4-8
Furrier	8	6-10
Grocery	6	4-8
Haberdasher	8	6-10
Hardware	6	4-8
Hat	8	6-10
Jeweler	8	6-10
Leather (handbags, trunks, etc.)	6	4-8
Millinery	8	6-10
Music	6	4-8
Notions	6	4-8
Piano	6	4-8
Shoe	8	6-10
Sporting Goods	6	4-8
Stationery	6	4-8
Tailor	8	6-10
Variety Store	8	6-10
Structural Steel Fabrication.....	6	4-8
Sugar Grading	15	10-20
Testing:		
Rough	5	4-6
Fine	10	6-12
Extra Fine, Scale Reading.....	20	10-50
Textile Mills:		
Wool:		
Carding, Picking, Washing, Combing	4	3-6
Twisting, Dyeing	6	4-8
Drawing-in, Warping:		
Light Goods	6	4-8
Dark Goods	10	8-16
Weaving:		
Light Goods	8	5-10
Dark Goods	12	8-16
Knitting Machines	10	6-12
Theaters:		
Auditoriums	3	2-4
Foyer	5	4-6
Lobby	8	6-10
Tobacco Products:		
Drying, Stripping	2	1-3
Grading and Sorting.....	15	10-20
Toilets and Wash Rooms.....	4	3-6
Warehouses	2	1-2
Woodworking:		
Rough Sawing and Bench Work Sizing, Planing, Gluing, etc.....	5	3-6
Fine Bench and Machine Fin-ishing	8	5-10
	10	8-16

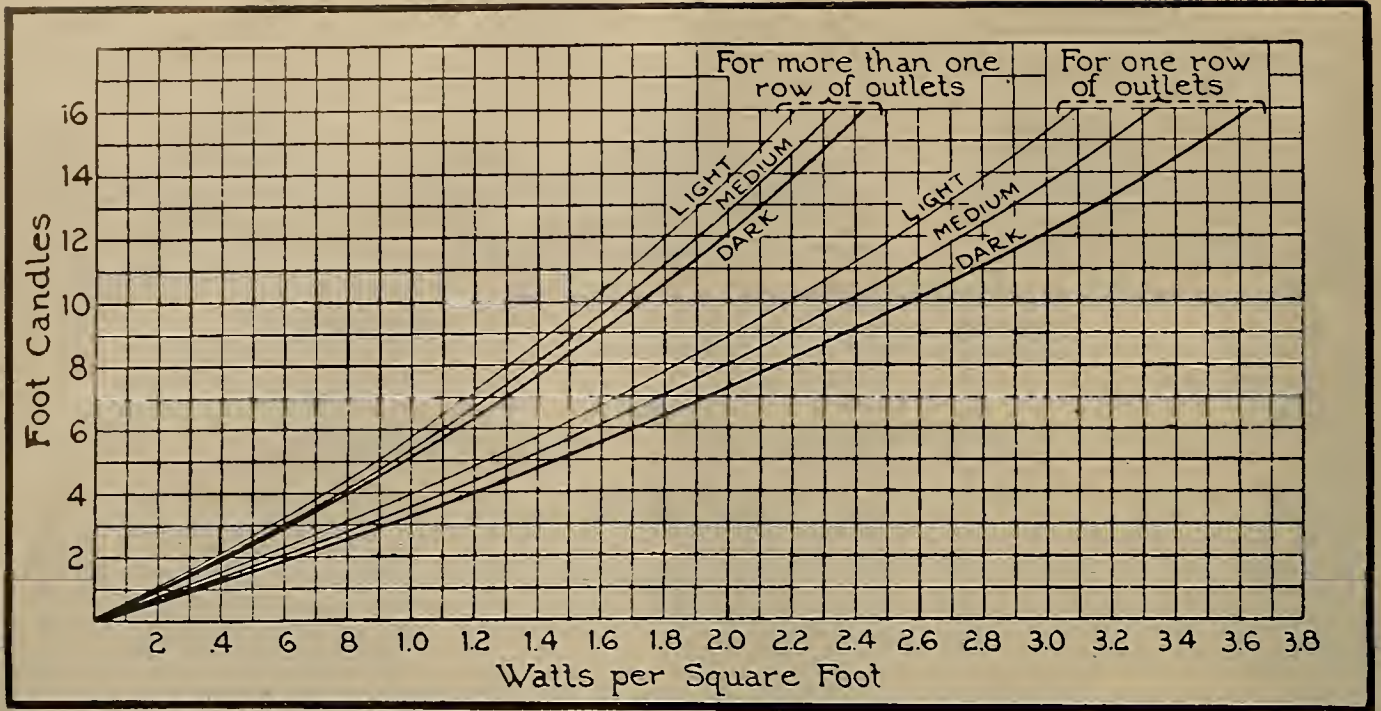


Fig. 2.

Except in special cases as cited above, the use of the now standard "R.L.M." (Reflector, Lamp, Manufacturers) dome type of reflector equipment, with Mazda "C" bowl enameled lamps, is the most desirable industrial fixture when considered as to reasonable first cost and efficiency.

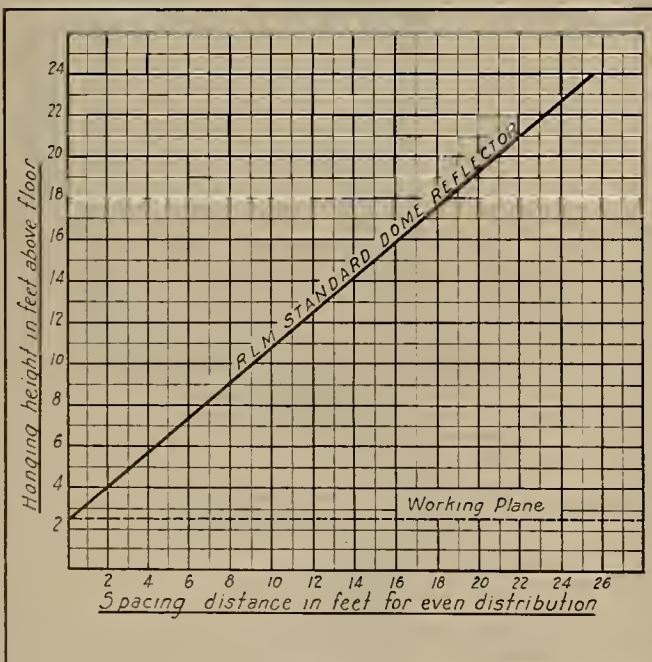


Fig. 3.

Several states have so-called "Lighting Codes" covering illumination of industrial plants, but as the minimum foot-candle intensities required are too low so far as efficiency in plant operation is concerned it is not advisable to even consider them. The recommendations of manufacturers have not to date been alike and they give limits of desirable intensity which are too broad. Table 1 is an example of this.

A more valuable table (Table 2) gives the recommended foot-candles. With this figure deter-

mined it is but necessary to lay the building into bays or squares and with the watts per square foot from curve (Fig. 2) determined, to multiply the area per bay or square in square feet by the W.P.S.F. and the result is the lamp size to use in watts. The next step is to determine the hanging height. As the distance between outlets is known from the layout of bays or squares a reference to Fig. 3 is but necessary to arrive at the correct result.

As an example:—Wood working shop for fine bench and machine finishing:

Building 50 ft. x 150 ft.

Ceiling 18 ft. (dark)

Walls (dark)

From Table 2 (10) foot-candles

Bays $16\frac{2}{3}$ ft. square—(278 square feet)

From Fig. 2—1.7 watts per square foot

278×1.7 —473 watts (use 500-watt)

From Fig. 3— $16\frac{1}{2}$ ft. is proper mounting height.

As Rule 23, first paragraph, of the Code allows but 660 watts per circuit, but one of these can be placed on a circuit. The third paragraph of the same rule, however, allows 1,320 watts per circuit by special permission where No. 14 B. & S. rubber covered wire is carried direct into keyless sockets or receptacles and where the location of these sockets and receptacles renders unlikely the attachment of flexible cords thereto. Also where, as in this case, Mogul sockets or receptacles not having fibre or paper lining are used, the circuit may be loaded to 4,000 watts provided No. 12 or larger wire is used to wire such sockets and receptacles and that the taps from the circuit wires are not over 18 inches long. This would then allow eight of the 500-watt units on a circuit, but as this number might be greater than is economical to give convenient control and also as the panel board would be more expensive due to the fact that it would be made up of 60-ampere switches fused to 35 amperes, it is more desirable to install two units on a circuit under the 1,320-watt rule as the difference in cost of conduit and wire is small in comparison with the future saving of current by more controls.

Present Retail Salesman's Creed in Westinghouse Booklet

A creed for retail salesmen drawn up by Joseph Luchs & Staff, Inc., has been printed in the Christmas issue of Counter Points, a publication of the Westinghouse Electric & Manufacturing Company. The creed is printed in the form of resolutions and is as follows:

THE 100% CREED of RETAIL SALESMANSHIP

Believing in the value, importance and dignity of my occupation as assistant to the public in promptly and conveniently supplying its manifold requirements; and in order to fulfill my responsibility acceptably to my customers, to my employer and to myself

I am Resolved

- (1) To treat each customer with the courtesy that springs from genuine friendliness and respect.
- (2) To have more thought for the customer's final satisfaction than for the amount of the immediate sale.
- (3) To know my stock—and to be accurate in statements about merchandise.
- (4) To be as attentive to the purchaser of an inexpensive article as to one whose needs are more elaborate.
- (5) To seek a clear understanding of the customer's exact requirements, that I may present merchandise which is precisely the thing desired.
- (6) To be patient with the customer who is provoked; prompt with the customer who is hurried; sympathetic with the customer who is puzzled; considerate of those who are difficult to satisfy and hospitable to those who are strangers in my store.
- (7) To be friendly but not familiar; cheerful, but not boisterous; to give information, not advice.
- (8) To keep my service up to the standard of my merchandise.
- (9) To increase my sales, not by means of persuasion or trickery, but by making customers feel that this is a store in which they are served pleasantly, capably and promptly; so they will wish to do as much of their buying here as their needs permit.
- (10) To be loyal to my employer, considerate toward my associates and thereby keep true to myself.

the Palace Hotel, San Francisco, Calif., recently. There were fifty-two members and guests present to hear Mr. Goodwin who spoke at length of the work of the society and of the needs of the electrical industry in general. He also dealt in detail with existing electrical merchandising methods and with certain necessary reforms. He gave a broad vision view of the potential market for electrical material and appliances and stressed the importance of cooperative thinking and action in the development of the manufacture and distribution of electrical merchandise.

The Electrical Wholesalers' Credit Club is an organization composed of electrical jobbers located north of the Tehachapi Mountains and has for its aims and purposes objects similar to other organizations of like nature. The club is working for a higher standard of merchandising and for a better maintenance of dealer credits. In addition to regular executive sessions, the club holds weekly luncheon meetings and monthly dinners.

George Curtis, of Universal Electric Company, San Francisco, Calif., is president and A. R. Fierce, of Wholesale Electric Company, San Francisco, Calif., is secretary. Walter A. Dold is attorney for the club.



Jim Redpath is here seen gazing forth into the future. This is Jim's specialty, especially in regard to association matters for he always works with a vision of extensive, state-wide membership.

Sacramento Association Elects New Officers for 1924

C. V. Schneider, of the Electrical Supply Company, Sacramento, Calif., was elected president and R. J. Finchley, of the California Mechanical & Electrical Engineering Company, Sacramento, was elected vice-president of the Electrical Contractors' and Dealers' Association of Sacramento at the recent annual election held in that city. The Executive Committee is composed of the following members: M. P. Cannon, of Latourette-Fical Company; G. C. Foss; W. Beamer, of J. A. Hobrecht Company; C. Vining; and L. M. McGinnis, of Scott Plumbing and Electrical Company. Roy N. Phelan is secretary-treasurer of the association.

Sacramento Valley Society Has Successful Dinner Meeting

On Dec. 12, 1923, over fifty members of the Sacramento Valley Electrical Society gathered at the Hotel Land, Sacramento, for the regular monthly meeting of the society. Dinner was served at 6:30 p.m.

Fred Links rendered two solos that were much appreciated by everyone and also led the group singing.

F. D. Bennett, of the radio department of Weinstock-Lubin Company, Sacramento, Calif., gave a most interesting talk on radio, describing the modern broadcasting stations, their methods of operation and the work they are doing. He spoke of the government regulations and the different classes of stations, and then briefly explained the various parts of a receiving set and their uses. He told of the several different types of antennas used with particular reference to the directional loop antenna.

Kimball-Upson Company broadcasted that evening for the special benefit of the society, the music from the Hotel Sacramento orchestra being received in the banquet room of the Hotel Land.

Accountant Addresses Alameda County Association

More than twenty-five members of the Electrical Contractors' and Dealers' Association of Alameda County were in attendance at the Dec. 11 meeting of the organization held in the Builders' Exchange Building in Oakland, Calif. F. V. Mitchell, San Francisco public accountant, was the principal speaker of the evening.

Mr. Mitchell, by using a set of figures taken from the books of an electrical contractor-dealer, showed the members of the Alameda County association the relation of overhead to gross sales and also to costs of material and labor. The three branches of the contractor-dealer's business were treated separately, thus showing a different percentage for overhead for contracting, fixture sales and appliance sales. A considerable amount of discussion followed Mr. Mitchell's talk.

At the same meeting, T. L. Rosenberg, of the Quality Electric Motor Company, and the re-elected president of the organization, announced the appointment of various committees. The committee personnel is as follows: Standardization Committee, H. V. Wright, Blundon & Wright; C. D. Bronson, California Electrical Construction Company; and R. H. Green, electrical contractor. Legislative Committee, H. H. Hoxie, Hoxie & Merch; R. H. Conrad, Conrad Electric Company; and Robert Norling, J. P. Maxwell Company. Jobbers' Committee, Edward Lickis, F. E. Newbery Electric Company; J. J. McCourt, Cooperative Electrical Company; and W. E. Scott, Scott-Buttner Electric Company. Membership Committee, Al. Weber, Paramount Electric Company; and G. E. Ortman, Ortman Electric Company. Attendance Committee, Sam. Bushman, Bushman Electric Company; R. E. Conrad, Conrad Electric Company, and E. C. Heister, Advance Electric Company. Joseph Croter is the secretary of the association.

Electrical Wholesalers' Credit Club Holds Monthly Meeting

A very interesting address was given by W. L. Goodwin, operating vice-president of the Society for Electrical Development, New York, N. Y., at the regular monthly meeting of the Electrical Wholesalers' Credit Club, held at

JOBBER, DEALER AND SALES AGENT



Telling the Story in the Palace of Electricity Over Three Hundred Thousand People Visit Electrical Section of Annual California Industries Exposition

A Palace of Electricity, the first of its kind ever to be presented in connection with the California Industries Exposition, was open to the public in San Francisco, Calif., from Nov. 17 to Dec. 2. The display which was presented to the visitors was made possible through the cooperation of the electrical concerns that participated in the exposition. The Exposition was held in the Civic Auditorium.

At the two previous expositions, which were also held in the San Francisco Civic Auditorium, electrical exhibits were scattered over the entire floor space used by the exposition. As a result the visitor to the exposition was not particularly impressed with the importance of the electrical industry. This was due partially to the fact that there were so many other exhibits sandwiched in between the electrical displays that the public on passing through the display room, drew the conclusion that the electrical exhibits were merely parts of a heterogeneous exposition and that the electrical industry was not making an effort to present a unified display. This fact tended to reduce the impression that was made upon visitors. Individual exhibitors did

not receive the same benefits from the exposition that it was possible to secure where the entire industry had its displays grouped in one central location.

The value of the cooperative display center was proved completely by the foodstuff exhibitors at the exposition in 1922. All of the concerns that handled foodstuff occupied booths that were located on one side of the hall. Visitors to the exposition were impressed with the apparent size of the foodstuff exhibits as the importance of the entire display was greatly enhanced by the method of grouping.

Following the example set by the foodstuff exhibitors, the electrical industry of the San Francisco Bay region determined to present a unified display which would attract the attention of the public because of its completeness. Arrangements were made to secure the entire floor space of the Polk Street Hall of the Auditorium as a space in which the electrical industry could present its exhibits. As this hall has an area of 8,000 sq. ft., ample space was available for use by members of the electrical industry. Rules were made by the exposition manager that only electrical concerns could present dis-

plays in the Palace of Electricity and this was the only location in which electrical exhibits could be placed. These rules were made primarily with the purpose of keeping non-electrical exhibits from the Polk Street Hall. In addition to doing this, the rules set the hall out as a definite section of the exposition and in this way the Palace of Electricity came in for much advertising that would not have been given the electrical exhibit if all of the displays had not been grouped in one place.

During the formation of the plan to have a Palace of Electricity at the California Industries Exposition, the San Francisco Electrical Development League agreed to sponsor the electrical exhibits. A committee, headed by C. L. Chamblin of the California Electrical Construction Company, was appointed to cooperate with A. A. Tresp, the manager of the exposition, in order that the electrical industry might receive the greatest benefit from the exposition. This committee acted for both the electrical industry and the management of the exposition and was largely responsible for the success of the affair.

This committee cooperated with exhibitors in planning the type of booths that were to be built in the Polk Street Hall, in order that all might be of the same type, and in addition to this arranged for a distinctive lighting arrangement for the entire hall. Blue and gold streamers were used to advantage in decorating the Palace of Electricity and the lighting plan carried out this same color scheme.

This general decorating was done under the direction of the committee, the cost being apportioned among the exhibitors. Approximately six hundred and fifty dollars was spent in this manner. Returns from the money spent in this way were most satisfactory as the decorative scheme was entirely different from that used in other parts of the Civic Auditorium.

Twenty-four concerns entered displays in the Palace of Electricity, this number of firms using nearly forty booths. While manufacturers used a considerable portion of the space, dealers and the two central station companies were also represented. The California State Association of Electrical Contractors and Dealers presented a booth that urged the home builder to require better wiring standards. A sign at one end of the hall announced that the Palace of Electricity was sponsored by the San Francisco Electrical Development League while one at the other end suggested the using of electricity for cooking and the giving of electrical Christmas presents. The California Electrical Cooperative Campaign also had its Better Merchandising display on the floor of the hall.



Interior of the Palace of Electricity facing east. The lighting effect was planned specifically for the exposition.

One of the novel displays presented in the Palace of Electricity was that of Landers, Frary & Clark. The display was arranged by Herbert A. Cram, Pacific Coast representative of the manufacturer, and had as the central ex-

hibit an electric range that had gone through the Berkeley fire. The range, at the time of the fire, was installed in one of the homes in the burned area and was exposed to the tremendous heat during the conflagration. After the ruins had cooled the range was removed from the site of the burned home and was brought to San Francisco. On testing the elements it was found that each of them was still in good order and that foods could be cooked on the burners. To show that the heating elements were still in good condition, Mr. Cram placed a tea kettle on one of the burners. Throughout the day steam came from the spout of the kettle, showing that the elements had withstood the ravages of the fire. A picture of the range as it looked amid the ruins of the Berkeley home was also a part of the exhibit.

According to exhibitors, a significant thing in connection with this display

to more than warrant the expenditure and the effort involved. Many actual sales were made during the exhibit and many more sales either were promised for the near future or will materialize within a short time. Particularly inter-



The range seen at the left, amid the ruins of the Berkeley home in which it was installed and the one at the right, boiling water in the tea kettle, are the same. The picture reproduced at the left and the range were parts of the Landers, Frary & Clark exhibit.

hibit an electric range that had gone through the Berkeley fire. The range, at the time of the fire, was installed in one of the homes in the burned area and was exposed to the tremendous heat during the conflagration. After the ruins had cooled the range was removed from the site of the burned home and was brought to San Francisco. On testing the elements it was found that each of them was still in good order and that foods could be cooked on the burners. To show that the heating elements were still in good condition, Mr. Cram placed a tea kettle on one of the burners. Throughout the day steam came from the spout of the kettle, showing that the elements had withstood the ravages of the fire. A picture of the range as it looked amid the ruins of the Berkeley home was also a part of the exhibit.

Other exhibitors presented displays of manufactured products and in most cases featured no particular item. All of the exhibitors paid careful attention to visitors, the attendants at the booths being instructed to give any information that it was possible to give, to interested persons. A considerable quantity of literature was used by the concerns who had booths in the Palace of Electricity and it is reported that visitors were, on the whole, anxious to secure any matter relating to the possible electrification of their homes or industrial plants.

No accurate check as to the number of persons who entered the Palace of Electricity was made, so it is not possible to state exactly how many people visited the electrical exhibits. The total attendance at the exposition was 362,000 and practically every person who visited the exposition entered the Palace of Electricity. In a number of cases sales resulting from work done at the exposition have been reported.

and which may be taken as indicative of the future major application of electricity, was the great interest shown in the major domestic electric appliances

ested were those who are now building or who are about to do so. The possibility of building into houses those comforts which electricity makes possible



On facing west, the visitor to the Palace of Electricity obtained the view reproduced above.

such as electric air and water heaters and electric ranges. Manufacturers of these devices reported that they were overwhelmed with requests for information as to these forms of application and that they secured a sufficient number of good prospects, during the show,

and of converting houses into homes had a strong appeal to all and resulted in a satisfactory sales follow-up. Merchants and others engaged in the sale of domestic electric heating equipment were well satisfied with this method of displaying their products.



The window at the left shows how lights improperly focused and without shields produce only a glare and do not correctly illuminate the display. With the same wattage, in the window at the right, the illuminating expert secured the result shown. The displays are those of a leading Salt Lake City jeweler.

Show "Before and After" Views to Your Prospects

Window Displays and Pictures May Be Used to Indicate Results that May Be Secured by Proper Electrification

"Ladies and Gentlemen! Here on my right hand we have the life-sized picture of an emaciated skeleton as he appeared six weeks ago. Then, ladies and gentlemen, this physical wreck, all skin and bones, started taking Bivouac, that marvelous tonic that builds you up over night, and now he looks as you see him in the flesh, at my left. Emil Palanzo, ladies and gentlemen, put on 92 lb. in four weeks. Bivouac did it, ladies and gentlemen. How many bottles at the price of 98 cents for one, \$1.29 for two, shall I wrap up for you? What Bivouac did for Emil Palanzo it will do for you, ladies and gents."

Though the electrical contractor-dealer will not find that this method of presenting his products and services to his customers is the best that he can employ, he may secure a definite message from the selling talk that the street vendor uses. Instead of dragging a soap box to the corner where he can present his Punch and Judy show and give his selling talk to a group of idlers, the electrical contractor-dealer announces himself and his products to thinking men and women through the columns of the newspaper. The electrical merchant also uses his display windows to attract attention to his establishment by presenting samples of his stock.

The purpose of the electrical contractor-dealer and the street vendor is the same—to sell services and merchandise.

Proper window lighting lends itself most readily to presenting the "before and after" message. Electrical retailers who wish to concentrate on increasing business in connection with window lighting work, and who have two display windows, are most favorably situated. One of the windows can be used to illustrate lighting conditions as they might appear before a competent illuminating specialist was called in to plan the method of lighting the window. The second window could show how much more attractive the display could be

made by installing proper illuminating equipment.

In Salt Lake City, Utah, the windows of one of the leading jewelers were used to illustrate the "before and after" message. One of the windows was lighted with dome lights, improperly focused and being placed so that the lights presented a glare to the eyes of the window-shopper. In the second window the same wattage was used, but the light was directed and a valance was hung from the top of the window to keep the direct rays from the eyes of anyone standing in the street. The results, as anyone viewing the two windows could plainly see, were entirely different. The first window, despite the fact that there were a sufficient number of lamps lighting it, presented a very poor display because of the way in which the light was directed. The second window, because of the fact that all of the factors governing the illumination were taken into consideration, stood out from the adjacent display and attracted much more attention.

TIMELY RESOLUTIONS FOR NEW YEAR RESOLUTIONISTS

By JOE OSIER

Now that Father Time (nee Kid '23) has flivvered noisily past, down the long road to Oblivion, his tail-light blinking in the distance, and—

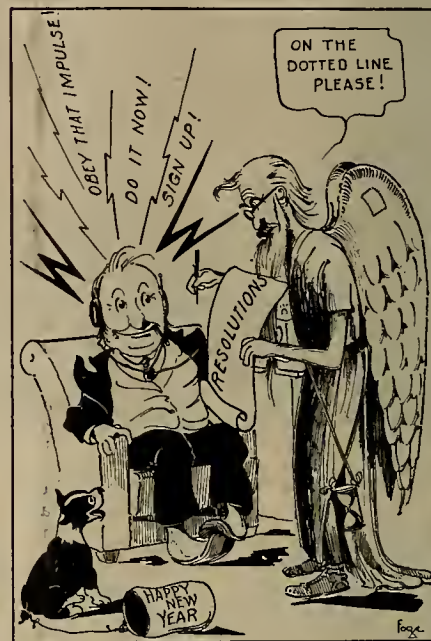
Kid '24, in a high-powered speedster, is booming along the straight-away with his cutout open—

The time has come for men in the Electrical Industry to retire to their offices and compose some snappy New Year resolutions to govern their actions during the coming twelve months.

To assist them in their labors, seeing that I am an admitted authority on thumbtacks, medium-priced cigars and commuting, I offer the following resolves, which I would make and keep were I in the business:

RESOLUTIONS

1. During 1924, I shall think in terms of service, rather than acquisition. I shall cut the mustard from my customers—work in their interests, resting assured that tin in my till will result.
2. I shall be loyal to my employees. I shall treat them fairly—like I expect them to treat me. I shall be kind and considerate, realizing that friendly words and cheery smiles cannot be placed in a pay envelope.
3. I shall be cheerful and optimistic. No matter how dour the day or dis-

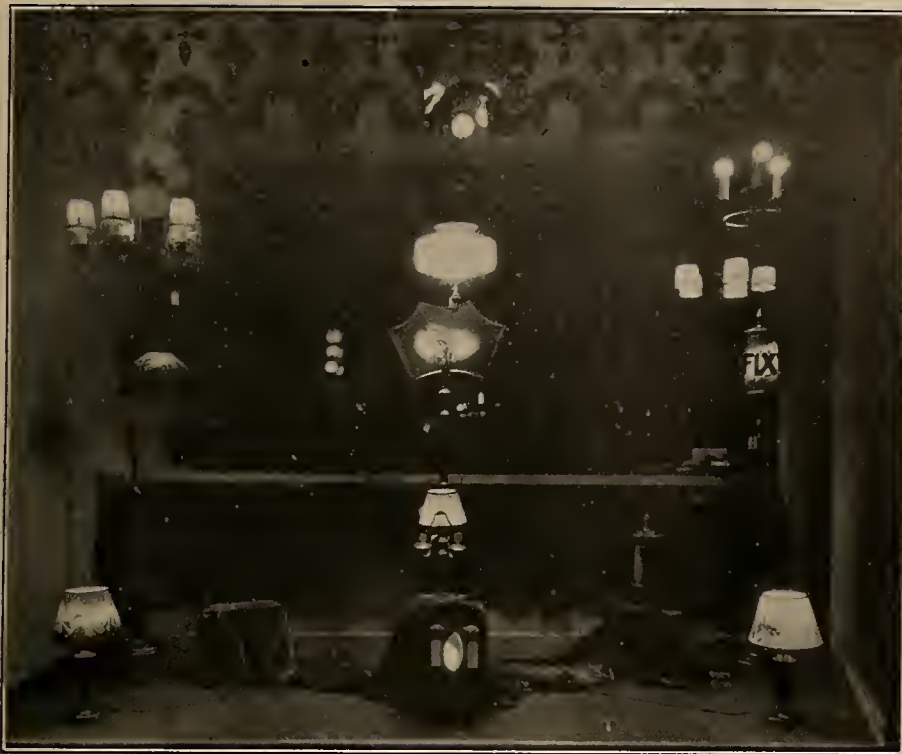


HAVE YOU SIGNED?

mal the immediate future, I shall not admit defeat, nor will I ever quit cold. I shall battle from gong to gong.

4. I shall be sure that I am on the right trail—then I'll mush on, breast-forward, never doubting the ultimate outcome.
5. I shall, absolutely, refuse to buy volume or contracts. Unless I can foresee where my share of the gate is coming from, I shall not don the spangles nor do my dance. Yea, verily, I shall count noses and figure up how much glue is forthcoming, because my days of harmonizing for nothing are done and gone.
6. I shall always be friendly and fair with my competitors, granting them an equal right to live and work and prosper. When I am aced out of a contract, I shall not bellow nor bluster, squeal nor squawk.
7. I shall not forget how to play—to laugh—to enjoy life. I shall foregather with the boys in my game on every occasion—business, social or otherwise. No meeting of my Association will be called but that I am parked in the front row. And, I shall lift my voice in approbation and words of optimism shall fall from my lips.
8. I shall keep my fingers on the pulse of my business, giving the air to non-essentials, non-producers and nonentities. Anybody and everything that is good and proper shall be blessed—contrary bounced.

I shall keep these resolves, s'help me.



Window display of the Seattle Lighting Fixture Company which shows what results may be obtained from using various individual lighting units.

Let the Display Sell Results Instead of Materials

Seattle Lighting Fixture Concern Uses Show Windows to Exhibit Illuminating Qualities of Various Units

"Sell holes, not augers," is the motto of the sales force of one of the largest bit manufacturers that sells not only to large construction companies but to jobbers in hardware material. The line of logic behind this motto is that the hole is the thing that the ultimate consumer is interested in and not in the means which he uses to secure the hole.

For the branch of the electrical industry that devotes itself to the manufacture and sale of lighting fixtures the salesman's motto might be changed to read "Sell home beauty and eye comfort, not metal and glass." The reason for this is that the housewife, who is the ultimate consumer of electrical lighting fixtures, is not interested in the materials that the fixtures are made of, but rather in what results she will obtain by using those fixtures in her own living room or kitchen.

A cheap white glass reflector might prove to give the residents of the home just as much light as a higher priced fixture which was built in a more decorative pattern. If the sales talk was directed along the lines of material and price, it might prove that the glass reflector would be more substantial and at the same time less expensive. On the other hand, if the prospective customer were approached with the statement that the ornamental fixtures would tend to beautify the interior of her home both in the day time and at night when they were lighted, she would immediately see that the decorative fixtures, despite their higher cost, would be the most suitable for her needs.

Add to the fact that the well designed fixture will beautify the interior of the home, the fact that the higher priced fixture will give a light that is much

easier on the eyes and the two sales arguments will in most cases tend to close the sale. If the salesman can secure from the prospective customer such information that he can be able to determine what fixtures are most suitable in the particular home, he will be rendering a great service to the customer by making suggestions as to what type of fixtures should be installed. By inferring that the installation of proper fixtures is a matter of personal interest and that he desires to see the home well supplied with equipment that will make for both beauty and comfort, the salesman will be placed in a position of confidence with the customer and will stand a much better chance of making the sale than if he just talked materials entering into the equipment.

The same method of reaching sales can be used in the presenting of window displays. The purpose in presenting any display is to attract attention and to bring about the desire for ownership in the person who stops to see the exhibit in the merchandiser's window.

Results are what the homeowner, that the exhibitor hopes to attract by means of the display window, is interested in and not particularly in the means that are used to secure these results. Thus the window decorator should endeavor to dress his show windows in such a manner that they will present an idea of what the particular type of fixture will do in the way of producing lighting effects. In many cases it is not possible to reproduce, in the display window, the conditions under which the articles on exhibit will be used and in these cases the decorator will be forced to present as nearly similar conditions

as he is able. The plan may also be used of not attempting to reproduce the conditions under which the merchandise is to be used, but rather of presenting the product in such a way that it will show what can be accomplished by the use of the merchandise.

The Seattle Lighting Fixture Company of Seattle, Wash., recently presented a window display of the latter type to the people of Seattle. As it was not practical to simulate home conditions in the window the decorator endeavored to present a display that would show what the various classes of fixtures would do in the way of providing illumination. A small number of fixtures was installed in the window and connected so that at night the effect of each type of fixture might be shown to persons who passed by the store. The fixtures were arranged in an attractive manner and care was taken not to put too many in the window. Dark colored velvet was used to form the back board of the display window and three pedestals, used as stands for small fixtures, were also covered with this material.

In this way an exceptionally attractive display was secured. The purpose of the window was to show just what certain fixtures would do for the purchaser. As the fixtures were in semi-isolated positions it was possible for the persons viewing the display to really tell just what each unit would do in the way of furnishing illumination.

In the display presented the Seattle Lighting Fixture Company was appealing not only to the retail purchaser but also to dealers who might see it as the



The cooking school has also been used to demonstrate results. Domestic science lecturers have not spoken regarding the value of the particular range that they used, but have stressed the benefits to be secured from cooking electrically.

company is one of the largest manufacturers and distributors of lighting fixtures, glassware and fittings in the Northwest. A manufacturing plant is maintained in Seattle and there all types of fixtures for street, commercial and residential lighting are produced. The concern is managed by Walter Funsinn, who has been associated with the company for a number of years. A branch, which serves as headquarters for salesmen covering the state of Oregon, is maintained in Portland.

INDUSTRIAL NEWS



Southern California Edison Co. Announces Large Budget

The expenditure of \$26,288,000 during 1924 for new plants, distribution and transmission lines and substations is included in the development program of the Southern California Edison Company, that was recently accepted by the board of directors of the company. This will bring the total amount expended since 1918 to \$118,000,000.

The major items included in the budget are:

Florence Lake tunnel.....	\$5,879,000
New Units in Big Creek power houses	
No. 1 and No. 2 to be placed in operation in 1925:	
25,000 kva. in Power House No. 1	2,100,000
16,000 kva. in Power House No. 2	
Dam and tunnel work.....	1,700,000
Distribution lines.....	5,943,700
Distribution substations.....	2,394,000
Transmission lines and stations.....	1,106,510

An addition will be made to the Long Beach steam plant of the company which will increase the capacity of that plant by 70,000 kw. It is planned to house two 35,000-kw. horizontal steam turbines in a separate building adjacent to the present power house. Eight 1,600-hp. boilers will be installed in the addition. Oil and gas burning furnaces will be used in the plant.

The company also proposes to construct four new 60,000-volt circuits on a new steel tower line adjacent to the present line leading from the Long Beach station. This line will provide means for distributing the power from the new steam plant. It is expected that delivery of the equipment will be made in time to permit the placing of the plant in operation early in 1925.

Aberdeen Power Project Halted by Restraining Order

The newest obstacle in the path of the proposed development of the Wynooche power project, on which the citizens of Aberdeen, Wash., at the recent city election voted to expend \$2,000,000, is the securing of a temporary injunction by Frank O. Dole of Aberdeen, restraining the city from entering into any sort of contract with Joseph Malinowski, for his power rights on the Wynooche. The injunction further restrains the city from expending any funds for acquisition or maintenance referred to in the ordinance recently passed by the voters. Mr. Dole's complaint states that the ordinance is void because it carried by but 100 votes out of 2,984, whereas to pass, it must have a three-fifths majority. The complaint also claims that proceeding with the project will make the debt of Aberdeen greater than the 10 per cent of the real and personal property valuation of the city which is the legal limit.

City councilmen, following the ratification of the project by the voters, immediately took steps to secure from Mr. Malinowski his water rights in the Wynooche. An optional purchase had been arranged, final purchase and payment being dependent upon further investigation and gagings which the city engineering force will make. If the project cannot be built for \$2,000,000, the matter will be resubmitted to the voters to ascertain whether they want more money to be spent on the project. Mr. Malinowski has left with the mayor and the city council the matter of placing a valuation upon his rights, with the right to have expert evidence presented as to the value.

Permits Issued for Idaho and Montana Power Projects

A preliminary permit for a period of two years covering a power project on Crane Creek, a tributary of the Weiser River, in Washington County, Idaho, has been issued by the Federal Power Commission to the Southern Idaho Land & Power Company, of Weiser. According to the permit the project works are planned to consist of a diversion dam, a storage reservoir, conduit and power house, and will have an estimated maximum installed capacity of about 25,000 hp. The probable market for the power will be the three irrigation districts in the vicinity of the project.

The Commission, at the same meeting, issued a preliminary permit for a period of two years to the Mineral Range Power Company of Columbus, Mont., for a power project on Woodbine Creek and Stillwater River at a point about 48 miles from Columbus. The project, it is estimated, will have an installed capacity of 3,000 hp., and will consist of a diversion dam, water conduit and power plant. The project is destined to supply power for mining, public utilities and the operation of an electric railroad.

Early in 1924, the Similkameen power plant of The Washington Water Power Company will be doubled in capacity by the completion of the new unit now being installed. The plant will then consist of two generators and turbine with combined capacity of 4,300 hp.

The Long-Bell Lumber Company, at Longview, Wash., has recently awarded to the Pittsburgh Transformer Company of Pittsburgh, Pa., through their Seattle representative, Eicher & Bratt, contract for a transformer bank of 27 units of 22,600 kva. each, costing \$80,000. The transformers will be used in stepping up the voltage at the power plant and logging camps, and for use in supplying light to the town of Longview.

Supervisors Vote to Evaluate San Francisco Systems

The San Francisco Board of Supervisors, on Christmas Eve, passed to print the resolutions requesting the California State Railroad Commission to place valuations on the San Francisco distributing plants of the Pacific Gas and Electric Company and the Great Western Power Company. The action was taken with an ultimate view of acquiring the properties of the power companies for municipal distribution of power in the city.

Various members of the board estimated that the cost of the valuation by the Railroad Commission would be between \$100,000 and \$200,000. The opinion of the board is that it will take a year for the valuations to be made by the Commission.

Opposition to the resolution was voiced by Ralph McLeran and John A. McGregor, who held that the city could not afford to spend the money on the appraisal at the present time. Supervisor McLeran also stated that within the next 60 days the voters would be called upon to approve a bond issue to complete the Hetch Hetchy water project and that the city could not expect to receive support from the 25,000 stockholders of the Pacific Gas and Electric Company, who live in San Francisco, if the city intended to condemn their property. He claimed that if the city acted to condemn the properties of the power companies, the bond issue for the completion of Hetch Hetchy would be defeated.

Filing on Bear River Is Made by Utah Utility Company

The Utah Power & Light Company has filed application with the state engineer of Utah for the use of 2,500 sec.-ft. of water from Bear River in Boxelder County and the right to store some 75,000 acre-feet of water from the same source.

Use of the 2,500 sec.-ft. flow is asked for the entire year. The storage right is asked to cover the period from Oct. 15 each year to July 1 of the following year.

The filing is made for the purpose of utilizing more effectively the water at the various seasons of the year at the company's Wheelon plant in Bear River Canyon.

The diverting works are described as a concrete overflow gravity type dam.

The new standard system of street lighting in Aberdeen, Wash., has been completed by the Ne Page McKenny Company, of Seattle, at a cost of \$20,000. Seventy-nine lamps were installed.

Washington Superpower League Opens Seattle Office

The Washington Superpower League, organized recently in Seattle, Wash., for the purpose of supporting and fostering the passage of legislation to permit cities to sell power outside their boundaries, has opened headquarters at 225 Railway Exchange Building, with Ralph D. Nichols, the secretary, in charge. Units of the league will be organized throughout the state, and the cooperation of labor unions, granges, city clubs and other public ownership organizations, is invited. The Erickson bill and Bone bill, both permitting cities to sell power outside their boundaries, will be immediately taken under consideration by the league.

The Seattle Municipal League, meanwhile, has gone ahead with its work of co-ordination of the various proposals for the control of the state's water power resources, and has issued a call for a state-wide conference of power enthusiasts to be held in Seattle shortly to consider every phase of the matter. Whether the Washington Superpower League, which was the original state power organization, will cooperate with the Seattle body is uncertain. The plans tentatively fostered by the promoters of the Seattle conference are said to be not in accord with the wishes of the so-called superpower group.

Power Company Resumes Work on Owens River Project

Construction work on the Owens River Gorge plant of the Nevada-California Power Company has been resumed. The plant when completed will have a capacity of 13,400 hp. The project will cost in the neighborhood of three and one-half million dollars. Excavation for the forebay is now in progress.

Transformers and transmission lines to deliver the power to consumers were installed at the time that the Adams plant was erected on the Owens River by the Southern Sierras Power Company, a subsidiary of the Nevada-California Electric Corporation which is also the parent company of the Nevada-California Power Company.

Construction was stopped during the suit of the City of Los Angeles when that municipality claimed that it had the rights to all of the water of the Owens River. The power company won the right to the waters of the river and the present work is being done as a result.

Celebrate Ground Breaking for Tacoma's Electric Home

With Mayor Fawcett and other city officials of Tacoma, Wash., in attendance, and a group of thirty business men representing the building and allied trades, ground breaking was celebrated recently for Tacoma's first model electrically equipped home. The house from attic to basement will be electrically equipped, and will represent the most modern ideas in this form of home-building. The structure will contain seven rooms, solarium and bath, and will represent an expenditure of from \$10,000 to \$12,000.

Previous to the ground breaking, announcement was made that a cash prize of \$50 would be awarded to the indi-

vidual living in southwestern Washington who submitted the best name for the electric home. It was suggested that this name embody in three to six words a suggestion of the convenience afforded the householder by electrical appliances.

While the home is intended to represent model living conditions on a moderate scale, it is primarily intended as a display of modern electrical work-saving appliances, and electrical men of Tacoma plan to demonstrate every known device for household convenience. The kitchen will be equipped with an electric dishwasher, ventilating fan, electric range, all sorts of small electrical equipment, and an electric refrigerating plant. A complete electrically equipped laundry will feature the basement. In addition to the electric furnace an emergency furnace using coal or wood, and equipped with electrical circulator, will be provided. Special lighting equipment and a multitude of outlets in each room are provided.

A large garage, equipped with electrical vulcanizer, radiator heater, tire pump, magnet and portable lights, is to be provided.

Following the ceremony of ground-breaking, at which Llewellyn Evans and B. R. Nichols of the municipal light department, gave brief addresses, the group visited the city hall annex, where a model of the Lake Cushman project is in process of construction, details of which were explained at length by J. L. Stannard, chief engineer of the project.

The Tacoma electric home will be constructed by Clarence E. Brown, realty dealer, from plans provided by Shaw & Shaw, architects, Tacoma Building. It is planned to have the home completely finished and furnished by March 15, and to have the house open for public inspection for a period of 30 days.

The city council of Sacramento, Calif., has unanimously approved a proposition looking to the establishment of a union street railway terminal for that city. The plan is to provide terminal facilities for the electric interurban roads which connect Sacramento with San Francisco Bay and also the cities of the northern Sacramento Valley. Certain regulations are laid down by the council such as provision that traffic shall be one way only over a set of tracks and that adequate clearance for street traffic must be provided at turns. A franchise is granted for track extensions necessary to enter the new terminal with the provision that this franchise will be withdrawn in the event of abandonment of the terminal.

It is reported that cable advices from Japan have been confirmed to the effect that the Westinghouse International Company and the Mitsubishi interests have effected a consolidation for the purpose of manufacturing in the Japanese territory. The new firm is to be known as the Mitsubishi Denki Kabushiki Kaisha (Mitsubishi Electric Manufacturing Company). It is said to be the intention of the new company to manufacture electrical machinery and supplies in Japan and to handle such Westinghouse products as are made in America and exported to Japan. The firm of Takata & Company, of New York City, are also reported as interested in the consolidation.

Electrified Lumber Mill to Be Erected Near Victoria

E. J. Palmer, vice-president and managing director of the Victoria Lumber & Manufacturing Company, whose plant at Chemainus, on Vancouver Island, was destroyed by fire in the latter part of November, has announced that the company is preparing plans for the erection of a new mill, which will have a capacity of 100 million feet of lumber per year and will be the largest lumber mill in British Columbia.

The whole plant will be electrically driven, the greater part of the electricity will be generated by steam, generated in turn, by the combustion of what in the past has been largely waste material. The new mill and allied plant will require 10,000 hp.

Mr. Palmer will retire from the active management of the company, with which he has been associated for 34 years, but will retain the vice-presidency, with offices in Victoria. The management of the plant will pass to J. Humbird, son of the president of the Weyerhaeuser Company, which is heavily interested in the Victoria Lumber & Manufacturing Company. Mr. Humbird now has the management of three mills at Sand Point, Idaho, the total capacity of which is about equal to that which the new plant at Chemainus will have. It is estimated that it will take about a year to assemble and erect the machinery.

Salt Lake Basin Water Power Is Subject of Publication

"The Water Powers of Great Salt Lake Basin," a paper prepared by Ralf R. Woolley, hydraulic engineer of the United States Geological Survey, is in the editorial department of the survey and will be issued early in 1924.

The paper sets forth all the present power developments and the undeveloped power sites, and gives a brief resume of the growth of power development in the basin as compared with the growth over the United States. The market for power, with the probable demand for meeting the industrial growth, the relation of power to irrigation and industry and the functions of the Federal Power Commission in the development of power resources also are discussed. The paper will be illustrated.

Mr. Woolley will prepare a similar report on the Green River and its tributaries. The maps of Green River Canyons are under preparation for publication.

Seven hundred children of the employees of the Puget Sound Light & Power Company, Seattle, Wash., were the recipients of Christmas gifts from nine trees laden with holiday presents and cheer. Under the direction of Norwood W. Brockett, vice-president of the company, and Mrs. Brockett, a force of company officers did the purchasing and R. W. Clark, sales manager, attended to the decorations. Music was furnished by the company band, both for concert and dancing, and the affair was greatly enjoyed by the more than 2,000 persons who attended. A. W. Leonard, president of the company, officiated as Santa Claus.

Will Make Additions to Honolulu Electric Power System

The expenditure of \$1,250,000 for improvements to the power plant and distributing system of the Hawaiian Electric Company of Honolulu, has been sanctioned by the board of directors of the company. The company will also expend an additional amount of \$500,000 for an office building in Honolulu.

Plans call for the raising of the capacity of the company's generating capacity by 35,000 kva. A new 12,500-kva. steam-turbine and two additional 826-hp. boilers with modern auxiliaries will be installed and a reinforced concrete smokestack, 226 ft. high, will be erected.

New power lines in the sugar cane plantations and other industrial districts of Oahu are to be built. The company has entered into a three-year contract to furnish power for operating the lines of the Honolulu Rapid Transit Company and extensions of the power distribution system in Honolulu alone will cost \$150,000. Plans also call for the erection of a new substation at Waikiki.

Light and power is to be extended to the Atrisco district of New Mexico immediately by the Albuquerque Gas & Electric Company. Orders have already been placed for some of the equipment as work will commence within the next fortnight.

Railroad to Pit River No. 3 Site Has Been Completed

The railroad which the Pacific Gas and Electric Company has been constructing in Shasta County, California, and which is to be used in connection with its Pit River development, has been completed. This new road, which is a branch of the company's Bartle-Pit No. 1 line, runs from Cayton Valley for a distance of five miles to the diversion dam site for Pit No. 3 and then five and one-half miles farther down the river to the power house site.

The site for this new 100,000-hp. Pit No. 3 plant is 33 miles by rail from Bartle, the eastern terminus of the McCloud River railroad which connects with the Southern Pacific lines at Sisson. With the completion of this new road, work will immediately begin on the construction of the power house.

The electrically operated steam shovels used in the building of the railroad will be used for excavating for the power house. The camp to accommodate 400 men has been completed at the Pit No. 3 site, and is about the same size as the camp at the dam site five miles up the river.

A tunnel approximately five miles in length, running from the dam site to the power house, has been driven in for a distance of 1,000 ft. from the eastern portal. This tunnel, which is really a combination of three tunnels, will be approximately three times as long as the diversion tunnel at the Pit No. 1 plant.

At a regular meeting of the Denver, Colo., section of the American Institute of Electrical Engineers the general subject of heavy railway electrification was treated in detail. The historical development of railway electrification was discussed by H. B. Barnes, consulting engineer of Denver. F. C. Hanker, general engineer of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., spoke on "Recent Developments and Future Possibilities" and H. D. Randall, district manager of the General Electric Company, spoke on "Electrification Economies."

Residents of the Silver Lake and Marysville districts in the State of Washington now have electric service for the first time due to the extensions which have just been completed by the Puget Sound Light & Power Company. These extensions also include the towns of Alderwood Manor and Granite, service to these latter places having been established during the summer.

Girand Complies with Arizona Diamond Creek Permit

Complying with the requirements placed in the permit issued to him by the state water commissioner of Arizona on Dec. 26, 1922, and disregarding the fact that the Federal Power Commission refused to grant him a license, James B. Girand, of Phoenix, Ariz., on Dec. 18, 1923, started construction work on the Diamond Creek dam on the Colorado River. The extent of the work that has been done is unknown.

Mr. Girand was issued a permit by the State of Arizona stating that construction work must be started before Dec. 25, 1923. This permit was transferred to the Colorado River Engineering & Development Company by Mr. Girand shortly after it was issued to him. A Federal Power Commission license was applied for and was refused pending the decision of Arizona as to whether or not it would ratify the Colorado River compact.

Previous to the time that construction work was started on the dam, Mr. Girand, in the name of the company to which the state permit was assigned, applied to the Arizona water commissioner for an extension of the permit issued in 1922. Upon the recommendation of Governor Hunt of Arizona the commissioner announced that this permit would be denied.

The original application filed with the Arizona water commissioner stated that a dam 300 ft. in height and 1,200 ft. long was to be built at the mouth of Diamond Creek to develop 200,000 hp. The permit that was issued allowed the appropriation of 10,000 sec.-ft. of water.

Development of Deschutes Power Site to Be Started Soon

Construction work on the Columbia Valley Power Company's proposed hydroelectric plant on the Deschutes River, near Metolium, Ore., is to be started in the near future according to F. R. Schanck, consulting engineer in charge of field investigations for the concern. It is reported that financing arrangements for the development have been completed and Mr. Schanck has stated that state and federal permits for water rights have been arranged.

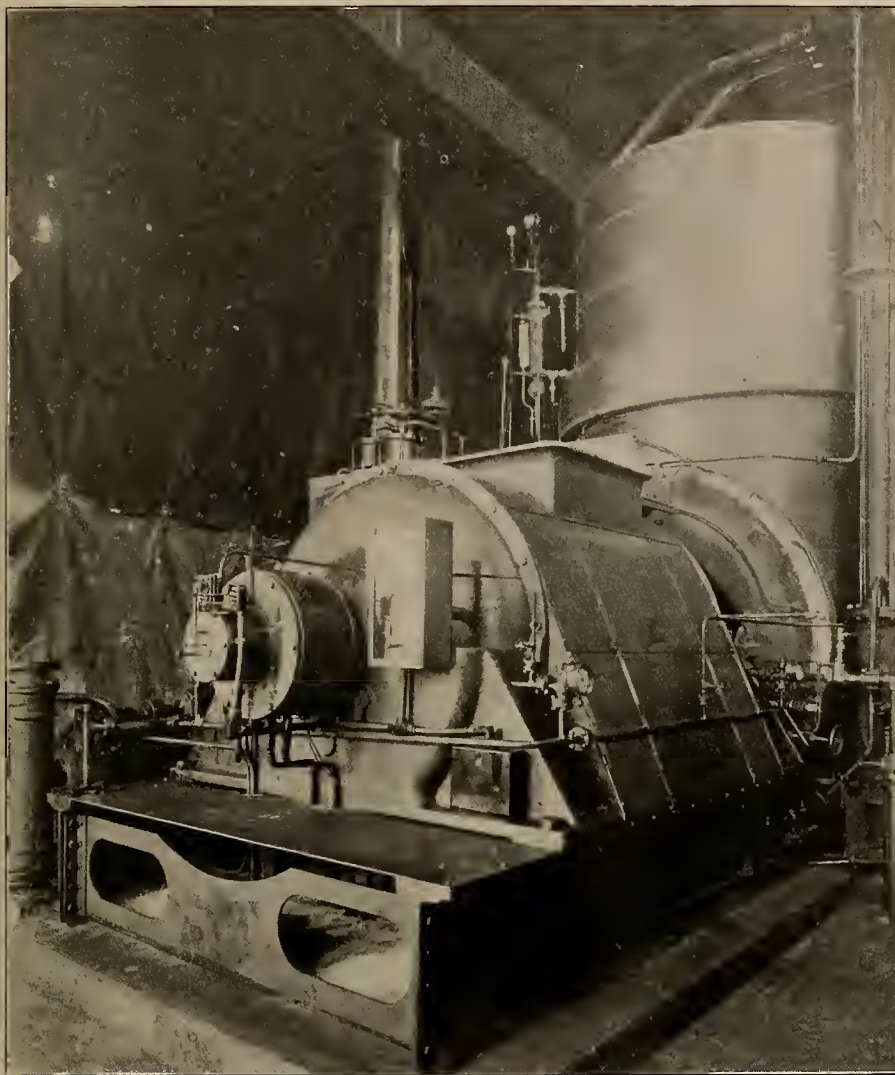
It is planned to construct dams and power houses at the junction of the Deschutes and Crooked Rivers and on the Pelton site, six miles below on the Deschutes River. The first two sites will develop over one hundred thousand horsepower, according to the engineer's estimates.

Immediate reconstruction of ten miles of high tension lines will be begun by the Pacific Gas and Electric Company between Nicolaus and Vernon, Calif. This is preliminary to the reconstruction of nearly fifty miles of high tension lines between Colgate Power House and Vernon.

Repairs and improvements to the Telluride, Colo., central station of the Western Colorado Power Company will be made in the near future. The cost of the work is estimated at \$15,000 and similar work will be started shortly on each of the other generating plants of the company in that region.



The first of a fleet of electric vehicles, to be purchased by the Denver Gas & Electric Light Company, now the Public Service Company of Colorado, was recently put in service. The company representatives standing beside the new truck from left to right are: Duke Barnett, superintendent of transportation; H. A. Tewksbury, manager of the stores department; and D. C. McClure, superintendent of the electrical department.



Condenser and generator of the mercury vapor process unit at the Hartford Electric Light Company's plant.

Mercury-Turbine Lowers Central Station Operating Costs

Indicated fuel saving amounting to 50 per cent per kilowatt-hour as compared with high-grade central-station practice, have been secured with the initial mercury-turbine installed in the Dutch Point generating plant of the Hartford Electric Light Company, Hartford, Conn., about four months ago, according to a statement made by Samuel Ferguson, vice-president of the company. Mr. Ferguson declared that the mercury boiler and turbine equipment constituted a revolution in the production of electrical energy from fuel.

The mercury boiler and turbine installation operating in the Hartford company's plant is one of two experimental sets manufactured by the General Electric Company from designs prepared by W. L. R. Emmet, consulting engineer of the General Electric Company. The first experimental apparatus was operated in the Schenectady Works of the manufacturer and the set that has been installed in the Hartford generating plant is the first commercial set of its kind ever constructed.

The mercury vapor process involves the vaporization of mercury in a boiler, driving of a turbine by the mercury vapor and the condensation of the exhaust in a condenser where its latent heat is delivered to water and thus used

to generate steam at pressure suitable for use in existing steam plants.

The condensed mercury runs back by gravity into the mercury boiler. Thus the mercury vapor acts as a heat conveyor and, at the same time, delivers energy to the mercury turbine. This affords a means by which the temperature range of operation is more than doubled as compared with ordinary steam processes, and the efficiency consequently greatly increased. Means are also provided by which the flue gases are brought to temperatures equivalent to those used in steam processes by being carried through a steam superheater and a feed water heater.

An application of this process on a large scale was built at Schenectady and operated experimentally on many occasions. This equipment was originally designed to give 1,500 kw. from the mercury-turbine but it was never run above 1,050 kw. Of the 1,050 kw. so delivered in these tests, 800 constitutes net gain as compared with a 200-lb. steam process operating with similar firing conditions. With such a performance of the mercury-turbine, and with the steam produced used as in the best power stations, this result is equivalent to about 11,300 B.t.u. from fuel per kilowatt-hour. Eighteen thousand B.t.u. per kilowatt-hour is considered extremely good in large existing steam stations.

Lawyer's Opinion Halts Sale of Seattle Power Bonds

Issuance of \$2,500,000 worth of Seattle, Wash., municipal light department bonds under an ordinance passed last May has been blocked by an opinion from Chester B. Masslich, New York bond attorney, engaged by the city to pass on all municipal bond issues. Mr. Masslich stated that the ordinance did not comply with the law governing utility bond issues.

The first effect of the ruling will be to halt the sale of \$200,000 worth of bonds sold recently to local brokers, who were also given an option on \$800,000 more of the bonds. Anticipating the sale of the bonds, the light department has been using current earnings to finance construction work and extensions properly charged to capital account, counting on reimbursement from the bond proceeds.

The adverse opinion is based on the state law requiring utility bond ordinances to specify the system or plan proposed and estimated cost of construction to be so financed.

The ordinance is one under which \$11,000,000 worth of bonds has been issued for building a 50,000-hp. hydroelectric plant on the Skagit River.

San Francisco Utility Takes New Public Relations Step

The Pacific Gas and Electric Company took a new step in the field of public relations, with the issuing on Dec. 15 of "P. G. and E. Progress," a magazine directed toward consumers, stockholders and employees. A total of 150,000 copies of the initial issue was printed and mailed and it is expected that the final circulation will be 400,000 copies.

"Progress" contains information concerning the company which will be of direct interest to consumers as well as stockholders and employees. Practically all electric and gas utilities have organs which are circulated among these latter two classes but few if any have attempted to include consumers.

The first issue of "Progress" is an 8-page miniature newspaper printed on letter size paper. It is well illustrated and contains a wealth of information about the company.

A new double-drum electric hoist has been ordered for use at the No. 1 workings of the Iron Blossom mine, located near Eureka, Utah. It will be installed on the 200 ft. or tunnel level, and will replace an air hoist which has been in there for a long time. The new hoist will be good for any depth up to 2,000 ft. At present the deepest work in that part of the Iron Blossom is 1,100 ft. Recent developments in that part of the Iron Blossom property have made new and better hoisting equipment necessary.

The East Bay Water Company, Oakland, Calif., has filed application with the California State Railroad Commission requesting authorization for the completion of its Upper San Leandro project. This project involves construction of a dam and reservoir at an expense of \$3,000,000 and will also provide storage for 13,600,000,000 gal. of water and an outlet tower, outlet tunnel, filtration plant, transmission lines and other features.

Fault Locator Put to Test on Power Company's Lines

Exhaustive tests designed to demonstrate the versatility of the Lundin fault locator were recently conducted on the lines of the Pacific Gas and Electric Company in San Francisco, Calif., by A. A. Barbera, of the Special Service Sales Company, Pacific Coast agents for the device. Similar tests were also conducted on the lines of the Puget Sound Power & Light Company in Seattle, Wash., and the Southern Sierras Power Company at Riverside, Calif.

The device, which is comparatively new on the Pacific Coast, is designed to detect and locate faults on distribution systems. Included among the characteristics that are claimed for the device are the abilities to analyze faults, to test circuits daily, to detect faults on live circuits, on buried systems, on direct current networks and on twin cables. It is also designed to detect grounds and short circuits on overhead and underground lines and to detect live crosses, leaky insulators, and tree grounds.

A fairly complete analysis and description of the device was contained in the 1923 Underground Committee report of the National Electric Light Association.

Similar sets are now being used by the Southern California Edison Company, the Los Angeles Gas & Electric Company, the Bureau of Power and Light of the City of Los Angeles and the City of Pasadena.

Los Angeles Council Votes More Money for Appraisal

Following the signing of a petition by 30,000 Los Angeles, Calif., citizens, calling for a referendum vote on the Los Angeles city council's ordinance setting aside \$25,000 for the securing of an appraisal of the electrical system of the Los Angeles Gas & Electric Company, the city council has repealed that ordinance. In its place the council has passed two ordinances, one calling for the payment of \$5,000 to the California State Railroad Commission for work already done in evaluating the local company's system, and the other providing for an expenditure of \$45,000 as the balance to be paid the commission for appraisal work to be done in the future.

The State Railroad Commission has already done some work on the securing of an appraisal of the company's electric system in Los Angeles and the costs of this have been set at \$5,000. The commission has reported that the entire cost will be \$50,000 or over.

World's Largest Hydroelectric Unit Placed in Service

The world's largest hydroelectric power unit was placed in commercial operation at Niagara Falls, Dec. 18, before a delegation of prominent electric power men and government officials, in the new power plant of the Niagara Falls Power Company on the American side of the Niagara River.

The generating unit is a 65,000-kva., 12,000-volt, 25-cycle vertical water-wheel driven generator, driven by a 75,000-hp. hydraulic turbine, with a total weight of over 1,750 tons. It is the first of two such units now being

installed by the General Electric Company and the William Cramp & Sons Ship & Engine Building Company of Philadelphia. The station, when completed, will have a rated capacity of 454,000 hp.

The unit just installed uses 3,500 sec.-ft. of water with an efficiency of at least 93 per cent. Using the same amount of water formerly used by seven 5,000-hp. units, it delivers energy equivalent to the output of fourteen such units.

Consider Denver Christmas Sales Campaign Successful

Members of the Electrical Cooperative League of Denver, Colo., have expressed themselves as being deeply gratified in the results of the Christmas campaign which has just been completed by that organization. The sale of appliances and the extensive use of new and interesting lighting effects, they feel are due to the efforts of the organization.

Considerable space was obtained in the editorial columns of the Denver and suburban papers stressing the idea of "Give Something Electrical" to accompany the five pages of cooperative advertising appearing in those papers just prior to Christmas.

Encouragement was given to the lighting of growing evergreen trees in the yards of Denver residents so as to tie-in with the community Christmas tree provided by the city. The use of small lighting sets with window wreaths to supplant the dangerous use of candles resulted in an additional demand for lighting outfits, according to O. L. Mackell, league chairman.

The British Columbia Electric Railway Company, Victoria, B. C., is asking for tenders from Canadian and United States manufacturers to supply insulators for the new high-tension line, now under course of construction, from the company's Jordan River plant to the auxiliary steam plant at Brentwood, on Vancouver Island. It is estimated that the cost of the insulators will be between \$10,000 and \$15,000.

The United States Civil Service Commission has announced that applications for a position as assistant electrical engineer in a power plant in the Philippine Islands will be received until Jan. 15. The duties are to act as technical adviser on all electrical matters and to take actual control of testing and designing work of power plant electrical equipment and to assist the mechanical engineer in charge of the steam plant.

A franchise has been granted to the Utah Power & Light Company to construct, maintain and operate electric light and power lines in Arimo, Idaho.

The city of Longview, Wash., will soon have additional electric energy for both commercial and domestic use. A new power plant of 1,500-kw. capacity and mounted on a barge for the Long-Bell Lumber Company is now being completed and will soon be in operation. This plant was originally intended only for the use of the lumber company but being of greater capacity than at present required by that firm, the excess will be made available for the use of citizens of the town. Oil will be used as fuel for the boilers of the new plant.

Cheyenne Company Places Boiler and Equipment in Service

The Cheyenne (Wyo.) Light, Fuel & Power Company has just placed in operation a new 600-hp. boiler. In addition to the new boiler installation, other improvements just completed include, new overhead coal bunkers of 400-ton capacity, track hopper for unloading coal, electrically-operated hoist from the track hopper to the bunkers, electrically-operated belt for distribution of coal in the bunkers, and overhead ash storage. The new boiler represents the latest type of equipment of this kind, including stoker and other automatic devices that make for operating efficiency. It replaces a 400-hp., hand-fired boiler.

Work is also progressing on the installation of a new turbine generator which is expected to be placed in service about March 1. The new generator will have a capacity of 1,800 kw., and will replace two old-style engine-driven generators of a combined capacity of about 600 kw.

The present capacity of the company's plant is about 3,000 kw. The new generator will increase this to more than 4,500 kw., thus providing generating capacity to take care of new demands and increases due to natural growth.

To Ship Oak Grove Turbine Unit Before Middle of Month

The 35,000-hp. reaction turbine built for the Oak Grove plant of the Portland Railway, Light & Power Company by the Pelton Water Wheel Company of San Francisco, Calif., has been assembled in the plant of the manufacturer and has been torn down for shipment to the power company. Shipment will be made early in January.

F. G. Robley, superintendent of water power plants, and A. Drill, chief engineer of power plants for the Portland Railway, Light & Power Company, recently visited the San Francisco plant of the manufacturer to make shop inspections of the new turbine. The turbine has been designed to operate under a head of 857 ft. and will be the highest head reaction turbine ever built.

The Westinghouse Electric & Manufacturing Company has been awarded the contract for the first unit of the new steam plant to be installed by the Los Angeles Gas & Electric Company at tidewater about twenty miles outside of the city. This plant is intended to be ultimately of 200,000-kw. capacity and will cost several millions of dollars. The first unit will run about \$750,000 in cost for generating equipment. It is expected to have the plant completed early in 1925.

C. Kirk Hillman Company, a Seattle, Wash., concern dealing in electrical machinery, recently moved to a new building especially constructed for the firm at 3201 First Avenue South. The new building has many labor-saving devices, including large traveling cranes for handling heavy machinery. The firm has been in business in Seattle for 10 years, and represents the following manufacturers: Wagner Electric Manufacturing Company; Electric Machinery Company; Roth Brothers & Company, and Roller-Smith Company.

Construction Problems Told in Illustrated Booklet

"Saving Sierra Snows," a 16-page booklet describing the construction problems and activities in connection with increasing the capacity of the Twin Lakes Reservoir of the American River project of the Western States Gas & Electric Company, has recently been published by The Holt Manufacturing Company, Stockton, Calif. The booklet, which is well illustrated, tells of the methods used in enlarging the reservoir and also in increasing the size of the El Dorado ditch that carries water to a new power house on the South Fork of the American River, near Camino.

Holt "Caterpillar" tractors were used in grading and in hauling wagon trains during the construction work in connection with the development. Part of the booklet is devoted to the explanation of the part that these tractors played in the construction work.

Heavy Pipe Fittings Are Being Welded Electrically

The Northwestern Electric Company is having its complicated pipe fittings for its new Portland, Ore., plant welded by the electric arc process by the Coast Culvert & Flume Company of Portland. The fittings, which are for the circulating water system from the condensers of the new plant, run from 28 in. to 48 in. in diameter, and are made of metal from 1 1/4 in. to 3/8 in. thick. The flanges on the ends of these fittings are manufactured complete. In the past, fittings of this type have been made from cast iron, and this is the first time that this type of work has been attempted in the Northwest from plate steel electrically welded.

These fittings have been inspected every few days by the engineers of the Northwestern Electric Company and pronounced satisfactory. It is conceded that investment and service in this class of construction will be more economical than the type of construction formerly used for this class of work.

Bids will be received by the City of Tacoma, Wash., until Jan. 21, for the purchase of \$4,000,000 of bonds designed for the construction of the Lake Cushman power project. Bidders are to state at what rate of interest they will take the bonds at par. The city cannot pay more than 6 per cent interest and a somewhat lower rate is anticipated in this case.

Orders have been placed with the General Electric Company by Hitchcock & Tinkler, Inc., for twelve electric locomotives for construction work in the new Moffat Tunnel in Colorado. This is the first transportation equipment requisitioned for use in connection with the driving of the pioneer tunnel. Electric power lines have been brought to both portals by the Colorado Power Company.

Construction work on the Oak Grove unit of the Portland Railway, Light & Power Company has been nearly stopped due to the coming of winter weather. Nearly all of the construction camps on the upper Clackamas River have been closed.



The Transportation Committee of the Pacific Coast Electrical Association, in convention at San Diego, Dec. 7. They are (top row, left to right) P. Ducker, Southern California Edison Company; C. D. Weiss, chairman, San Diego Consolidated Gas & Electric Company; J. S. Moulton and O. M. Simpson, San Joaquin Light & Power Corporation; and W. O. Fairbanks, Southern California Telephone Company; (bottom) F. C. Rotsel, Bureau of Power and Light, Los Angeles; S. B. Shaw, Pacific Gas and Electric Company, San Francisco; Andrew Swanson, Bureau of Power and Light, Los Angeles; J. M. Wainscoat, San Joaquin Light & Power Corporation; and R. A. Johnson, Bureau of Power and Light, Los Angeles.

Transportation Committee Holds Second Meeting of Year

Transportation problems, labor saving devices and methods in connection with transportation equipment of public utility companies, electric trucks, and special machinery, gave the Transportation Committee of the Pacific Coast Electrical Association, in conclave in San Diego, Calif., Dec. 7 and 8, much to discuss and report upon. In its second meeting of the year the committee, a sub-committee of the Stores and Purchasing Committee of the Pacific Coast Electrical Association, made first reports on the organized work for the year. C. D. Weiss, chairman, entertained the committeemen for this occasion.

Present in the San Diego meeting were: W. H. Fairbanks, superintendent of shops and vehicles, Southern California Telegraph Company, Los Angeles; J. S. Moulton, engineer, J. M. Wainscoat, superintendent of transportation, and O. M. Simpson, chief clerk of the supplies division, San Joaquin Light & Power Corporation, Fresno; R. A. Johnson, superintendent of transportation, Andrew Swanson, general shop foreman, and F. C. Rotsel, general line foreman, Bureau of Power and Light, Los Angeles; S. B. Shaw, automotive engineer, Pacific Gas and Electric Company, San Francisco; and P. Ducker, superintendent of transportation, Southern California Edison Company, Los Angeles.

The University of Washington Engineering Experiment Station has recently published Bulletin No. 17. The bulletin is entitled "Transmission Line Design." Part I is devoted to the mechanical features of design and was prepared by Frederick Kurt Kirsten, associate professor of electrical engineering. The bulletin is well supplied with charts and tables.

New Street Lighting System in La Jolla Put in Service

The long curved highway through La Jolla, suburb of San Diego, Calif., was lighted up for the first time by its new lighting system on Dec. 15. Following the contour of the sea shore, winding its way through this community of homes and community buildings, the new lighting system made a white ribbon of light seen clearly from the heights of the Biological grade, two miles north of La Jolla.

The La Jolla lighting system, the first of a number planned by residents of that community, runs along the state highway between San Diego and the north. The lights are set on 14-ft. concrete standards, staggered all along the white concrete highway. Each lamp is of 400-cp. intensity, and is equipped with the special glassware to direct the light to the street.

Because the lights illuminate the state highway, over which thousands of motorists pass day and night, the system is kept lighted all night long. The La Jolla system was the second unit of San Diego's new street lighting program to be completed. The Broadway system was turned on for the first time the week previous.

The opening up of the new Wellington oil field north of Denver, Colo., has necessitated the making of two railroad extensions into that territory, one of which will be electrified. The Public Service Company of Colorado is now engaged in making a survey for a transmission line to be extended from Fort Collins.

The Hunt Electric Company, after a year in a downtown office building, has opened a retail electric shop at 1408 Stout St. in Denver, Colo. The Eden washing machine and America cleaner are being featured by the company.

Meetings

Los Angeles Orphans Guests of Local Electric Club

The Electric Club of Los Angeles, Calif., held its annual Christmas party for the Kiddie Koop Orphan Home on Dec. 24, before the largest gathering of its kind. It was considered by all those present that it was the best and the finest in the club's history, while the entertainment which had been arranged for the special benefit of the children under the guidance of James G. Loomer, was exceptional and proved the hit of the day. St. Nicholas was there in the person of Paul D. Howse and created quite a furore amongst the youngsters when he came through the fireplace which had been arranged for the occasion.

The big ballroom of the Biltmore Hotel was full, some 500 people being present, while the arrangement of the Christmas tree, decorations and lighting effects, made the room exceptionally attractive. The tree was placed at the center of one end of the room and was effectively decorated and flood lighted from both sides. Behind the tree and to the right was a homelike setting with a huge fireplace, which was flood lighted in red, the whole setting adding extensively to the spirit of the occasion.

Amendments to Washington Power Measure Sanctioned

Two amendments to the proposed Erickson superpower measure, to be presented to the voters of the State of Washington in 1924, were recommended and agreed upon at a meeting of members of the Washington State Superpower League, held in Seattle recently. The amendments are designed to make the bill more suitable to local municipal ownership advocates.

The first amendment states that the power districts, that would be created under the proposed Erickson measure, might not condemn the hydroelectric plants and lines of cities now owning and operating their own systems. The second provides that smaller units than counties might band themselves into power districts.

Appoints Pacific Coast A.I.E.E. Convention Committee

Plans for the 1924 Pacific Coast Convention of the American Institute of Electrical Engineers to be held at Pasadena, Calif., during the week of Oct. 13, are already well under way. Several important papers have been arranged for and plans have been laid to have those in attendance at the convention visit the new 1,000-volt laboratory of the California Institute of Technology. According to present arrangements the program this year will be of national importance.

The arrangements committee for the convention has been appointed by Harris J. Ryan, president of the Institute. This committee will make all of the local plans for the convention. The personnel of the committee is as follows: R. W.

Sorensen, chairman, Los Angeles; O. F. Johnson, secretary, Los Angeles; M. O. Bolser, Los Angeles; E. E. F. Creighton, Schenectady; H. B. Dwight, Denver; E. R. Hannibal, Spokane; C. R. Higson, Salt Lake City; W. C. Heston, San Francisco; C. W. Koerner, Pasadena; J. A. Koontz, Jr., Palo Alto; C. A. Lund, Tacoma; F. W. MacNeill, Vancouver; S. G. McMeen, Pasadena; L. W. W. Morrow, New York; E. F. Pearson, Portland; E. R. Stauffacher, Los Angeles.

Street Railway Men Entertained by San Diego Club

The street railway contingent of the San Diego Electric Club had its day, Dec. 11. At that meeting Sam Mason, superintendent of equipment of the San Diego Electric Railway, who brought with him 30 street railway officials, among them Claus Spreckels, the vice-president and general manager, was responsible for having the meeting turned over to the railway men.

The new type street car which San Diego is to have beginning the first of the year, was the main topic of discussion. Musical numbers added to the day's program.

In its last meeting in 1923, on Dec. 18, with Al May as chairman, Judge Lacey Jennings of San Diego spoke on "The Constitution and the Supreme Court." Judge Jennings gave an intensely interesting discussion of the criticism being directed at the Supreme Court and of its justice or injustice.

The Electric Club of Seattle, Wash., on Dec. 8 held its annual dinner and dance at the Seattle Yacht clubrooms, one of the most successful and enjoyable affairs the club has ever held. Harry Martin, president, presided at the dinner, and the following members of the club helped to make the event a success: J. R. Wells, Fobes Supply Company, chairman; Charles Smutz, Western Electric Company; Jim Stewart, Pacific States Electric Company; Harry Byrne, Jr., North Coast Electric Company; and Dick Cole, Economy Fuse Company.

W. H. Talbott Elected Employees' Association President

William H. ("Bill") Talbott, superintendent of the electric meter department of the San Diego Consolidated Gas & Electric Company, was recently elected by a two to one majority to the presidency of the employees' association of his company. Mr. Talbott is a member of the national meter committee of the National Electric Light Association, and of the technical and executive committees of the Pacific Coast Electrical Association. He was chairman of the meter committee of the Pacific Coast Electrical Association last year. In the San Diego Consolidated Gas & Electric Company he is superintendent of the electric meter department and will be the tenth president of the employees' association.

Mr. Talbott was the association's first president, and was again elected its president for the third year of its existence. Since 1919 W. H. Ellison has held the office, as a rule uncontested.

San Francisco Club Entertains Sixty-five Children

Sixty-five children from the San Francisco Nursery for Homeless Children, and a considerable number of children who are being cared for by the Salvation Army were the guests of the San Francisco Electrical Development League at the organization's annual Kiddies' Day held in the gold ballroom of the Palace Hotel on Dec. 17. Five hundred members and friends of the league were also present to witness the coming of Santa Claus.

Presents, which the children had asked Santa Claus to bring them, were delivered to the guests following a musical entertainment presented by students of a local dancing teacher. The entrance of Santa Claus was particularly satisfying to the children who watched the Christmas visitor come from a small house that had been erected upon the stage.

The Kiddies' Day program was arranged by Arthur E. Rowe, of Garnett Young & Company.



Santa Claus brought presents to the children at the San Francisco Electrical Development League's party, from the log cabin built on the stage.

Manufacturer, Dealer and Jobber Activities

The Waage Electric Company, Chicago, Ill., has announced that on Jan. 1, 1924, it will move its offices, including sales, purchasing and accounting departments, from 12 South Jefferson Street, Chicago, to the company's new factory at 5100 North West Ravenswood Avenue in the same city.

The Ingersoll-Rand Company, New York, N. Y., has recently secured an order from the New York Edison Company for a 35,000-kw. surface condenser. This condenser is to be installed under a 35,000-kw. General Electric turbine at the central station company's Waterside Station No. 1. The condenser is of the standard Ingersoll-Rand external cooler design with single pass water circuit.

The Westinghouse Electric & Manufacturing Company has announced that voltages in excess of 1,000,000 were made recently to perform spectacular phenomena at the high voltage laboratory at Trafford City, Pa. Flashing zigzag arcs and high potential surges were included in the demonstrations, which were witnessed by members of the American Institute of Electrical Engineers and some visiting engineers of other countries. The feature of the demonstrations was the forming of a 42-ft. arc at a potential of 1,000,000 volts. This was the largest controlled arc ever made artificially and it set a world's record for laboratory work.

The General Electric Company, Schenectady, N. Y., has designed a new type of cutout for fusing primary circuits of transformers up to 7,500 volts, 100 amperes maximum. This is known as the Type E, form B, General Electric expulsion type fusible primary cutout. This cutout has many new features which are said to increase its electrical efficiency, mechanical strength, convenience and safety of operation and life.

The Triumph Electric Heating Corporation of southern California has been organized to take over the manufacture of the electric radiator of that name invented by Edmund B. Lennig, heating engineer, formerly of San Francisco and Oakland. A. M. McLellan is president; Arthur Hess, vice-president, and Charles McKinnis is secretary and treasurer. Mr. Lennig is superintendent and engineer of the organization. Also affiliated with it is George Peck, heating engineer.

D. W. Columbus and Leslie Lyons of the Red Lodge Electric Company, Red Lodge, Mont., have recently completed the construction of an electric sign on which they are endeavoring to secure a patent. The sign presents an alternating shadow lighting of the characters superimposed upon it. The large finished model of the sign has been installed on the building of the electric company and the small model is being sent to the patent office at Washington, D. C.

The Illinois Electric Porcelain Company, Macomb, Ill., has issued a new catalog and handbook of pole line insulators. This book will be furnished on request to the manufacturer.

F. W. Rust & Company, Inc., Seattle, Wash., electrical contractor-dealers, formerly located at 218 Columbia Street, have moved to larger quarters in the Campbell Building, Fourth Avenue and Columbia Street.

The F. W. Wakefield Brass Company, of Vermilion, Ohio, has announced that it has put on the market a new porcelain enameled unit for kitchen lighting. Several new features, it is claimed, are incorporated in this fixture. The socket is attached to the ceiling by a die-formed metal strap, and the wiring connections are made to this skeleton. The combination canopy and holder, which is of heavy porcelain enameled steel, is then slipped into place and is held firmly and snugly against the ceiling by two bayonet screws. Two lugs and a single set screw hold the glass-ware.

The Ward Leonard Electric Company, Mount Vernon, N. Y., has increased its line of Vitrohm cast iron type of variable rheostat plate by adding new sizes of plates. The field now covers from a 5½-in. square to a 14-in. square plate. They also include in the line a larger plant in standard size, 15 in. x 24 in. The round type of plates are made in sizes from 5-in. diameter to 19-in. diameter. On these plates a straight same ampere capacity of resistance throughout is used for motor armature control—a two to one taper to eight to one taper for generator and motor field control.

George Cook, who for the past eight years has been city electrical inspector of El Paso, Texas, and who recently took over the Rogers Electric Company at 315 Texas St., El Paso, has moved to new and enlarged quarters at 600 North Stanton Street and has changed the firm name to C. & C. Electric Company. Mr. Cook will carry on a general electrical contractor-dealer and retail business.

Ernest V. Beck and James W. Ryall, both prominent for a number of years in the jobbing business of Denver, Colo., are the incorporators of a new electrical supply house which will shortly make its appearance in Denver, bringing the total of electrical jobbers up to nine. Mr. Beck until recently was manager of the Central Electric Supply Company and previously was associated with the Hendrie & Bolthoff Manufacturing & Supply Company and the Poindexter Supply Company, both in Denver. Mr. Ryall will not sever his connections as manager of the electrical department of the Mine & Smelter Supply Company until Jan. 1. He formerly served as purchasing agent of the Western Light & Power Company and was also associated with the Mountain States Machinery Company. A location for the business has already been secured in the new Barnes Building, 1414 Glenarm St., but it is believed the store will not be ready for occupancy until the first of the new year. The new company, which was incorporated for \$50,000, will be known as the B & R Electrical Supply Co.

The Johns-Pratt Company, Hartford, Conn., has issued a bulletin on Noark Universal Service switches which will be of interest to all contractor-dealers and those concerned with construction work.

The Electric Material Company, with offices in San Francisco and Los Angeles, Calif., and Seattle, Wash., has announced that after Jan. 1, 1924, it will not represent the American Copper Products Corporation.

The Valley Electric Company, St. Louis, Mo., has issued a new catalog of Valley motors which contains full information concerning the line made by the company. This catalog will be furnished upon request to the Pacific Coast office of the company, 429 Rialto Building, San Francisco, Calif.



During the Christmas rush in 1922, P. H. (Percy) Booth, of the Edison Electric Appliance Company, found business coming in so fast and furiously that he had to use his own automobile to bring heating devices from his company's factory at Ontario, Calif., to Los Angeles dealers. Percy said that he had 2,000 lb. of equipment on his car at the time he struck the noble pose shown above.

Personals

D. C. Green, formerly vice-president and general manager of the Fort Smith Light and Traction Company of Arkansas, has been named vice-president and general manager of the Utah Power & Light Company and vice-president of the Utah Light & Traction Company. Mr. Green succeeds S. R. Inch, who has resigned to accept an important position with the Electric Bond & Share



D. C. GREEN

Company in New York. Mr. Green has had a wide experience in the management of electric and gas utilities. As an electrical engineer, having graduated from Purdue University in 1908, he went from college to his first position with the San Diego Consolidated Gas & Electric Company. His ability was soon recognized, and he was promoted to the position of manager of the Oregon Power Company and the Everett Gas Company of Everett, Wash. Early in 1915 Mr. Green came from the Northwest to Salt Lake City as manager of the Salt Lake division of the Utah Power & Light Company. He left Salt Lake City in the fall of 1916, and since that time has been associated with various utilities in a managerial capacity. In addition to his ability gained through wide experience in the management of utilities, Mr. Green is particularly well qualified to handle the duties of his new position, due to his former association with the Utah Power & Light Company and his familiarity, therefore, with that company's operations and policies. The change will not sever Mr. Inch's connection with the Utah companies, since he remains a vice-president and director of both.

J. B. Hassett, who for some years has been an assistant in the purchasing department of the Great Western Power Company, San Francisco, Calif., has resigned to become western manager for the Charles R. De Bevoise Company, manufacturers of specialties. Mr. Hassett's territory will include the five western states and he will have his headquarters at 140 Geary Street, San Francisco.

W. H. Talbott, superintendent electric meter department, of the San Diego Consolidated Gas & Electric Company, has been elected president of the employees' association of the company. The association has approximately one thousand members and is organized for insurance, education and social purposes.

A. D. (Dent) Slaughter, manager, Allied Industries, Inc., San Francisco, Calif., is on a trip to the Northwest, combining business and pleasure. He spent Christmas with relatives in Idaho and will shortly leave for the East where he will visit the factories which his company represents.

C. E. Heise, San Francisco district manager of the Westinghouse Electric & Manufacturing Company, has recently returned after five weeks' absence in the eastern states where he attended the American Railway Association and the district managers' meeting of the Westinghouse Company. He also made a survey of electrical conditions in eastern centers.

F. J. McEniry, field representative of the Electrical Cooperative League of Denver, at the invitation of several of the leading architects in Pueblo, Colo., visited that city early in December to assist wherever possible in the improvement of electrical layouts and to establish further contact with the electrical industry in that city.

Governor William E. Sweet, of Colorado, has appointed a special committee to arrange for a celebration to mark the fiftieth anniversary of admission of the State of Colorado to statehood and also to commemorate the completion of the Moffat tunnel. The electrical industry will take an active part in this celebration and Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, Denver, Colo., is ranking member of the committee.

Earle M. Marsh, for some years salesman in the domestic applications department of the Pacific Gas and Electric Company, San Francisco, Calif., has resigned to join the force of the E. A. Wilcox Company, San Francisco. Mr. Marsh will have charge of appliance sales.

Ray W. Murphy, Pacific Coast manager; Paul R. Prietsch, manager of miniature lamp sales for the Pacific Coast; R. S. Prussia, illuminating engineer, of the Westinghouse Lamp Company, San Francisco, Calif., and Harry A. Grace, manager of advertising for the same company, with headquarters at New York City, have just completed a tour of the Pacific Coast states. Stops were made at Los Angeles, Portland, Seattle, Spokane, Butte, Salt Lake City and San Francisco. At Salt Lake City a merchandising show was presented to Westinghouse Lamp Company jobbers and salesmen. Motion pictures and lantern slides were used and thorough instruction was given in the use of advertising matter.

John William Lieb, of New York City, has been awarded the Edison Medal of the American Institute of Electrical Engineers. This medal is awarded annually for meritorious achievement in electrical science, electrical engineering or the electrical arts.

F. W. Roller, president of the Roller-Smith Company of New York City, is at present in San Francisco en route to the Orient.

Charles L. Hill, sales manager of the California Wire Company, Orange, Calif., was a recent visitor to San Francisco. Mr. Hill was in San Francisco in connection with the appointing of the Baker-Joslyn Company as the wire company's distributor for the Pacific Northwest and northern California territories.

A. A. Barbera, western representative of the Special Service Sales Company, 202 Russ Building, San Francisco, and 502 Delta Building, Los Angeles, Calif., has just finished a tour of the Pacific Coast territory. This company is Pacific Coast distributor for Morganite Brush Company, Inc.; Anchor Webbing Company; Minerallac Electric Company and for the Hanses brand of electrician's gloves and lineman's pull-over gloves.

L. R. Brown has been appointed manager of the transformer division of the new central station department of the General Electric Company, Schenectady, N. Y.

Henry Grant, superintendent of the Puget Sound International Light & Power Company, Everett, Wash., has been appointed superintendent of the interurban lines of the Puget Sound Light & Power Company between Seattle and Tacoma and Seattle and Everett. Mr. Grant will take up his new duties on Jan. 1, 1924.

J. N. Addis, San Francisco branch manager for the California Wire Company, has been called to the company's factory at Orange, Calif., to fill a more important position there.

C. A. Maydwell, president of Maydwell & Hartzell, Inc., has just been elected president of the Foreign Trade Club of San Francisco. Mr. Maydwell has been active for several years in the foreign trade of San Francisco and the



C. A. MAYDWELL

West and has himself been an important exporter. He has for several years represented manufacturers of electrical goods, specializing on construction material and transmission and distribution supplies. His connection of over twenty years with the export situation places him in excellent position to guide the activities of the Foreign Trade Club along the lines of constructive effort.

Harry V. Patton, salesman in the Martinez district for the Pacific Gas and Electric Company, has resigned to enter the electric heating engineering business for himself at that point. Mr. Patton will do a general sales engineering business in electrical equipment for both domestic and industrial purposes.

W. Veit has been appointed by the Valley Electric Company, St. Louis, Mo., to represent that firm in California. Mr. Veit will have offices at 429 Rialto Building, San Francisco, and from that point will direct the company's activities throughout the state.

Gray E. Miller, sales manager of the Sewickley Electric Company, Sewickley, Pa., is making a survey of the Pacific Coast with relation to business development possibilities. He is accompanied by H. M. Thomas, Oakland, Calif., western representative of the company.

Frederick N. Dodge, formerly sales manager of George W. Smith & Company, Inc., Philadelphia, Pa., has joined the staff of The Society for Electrical Development. At one time sales promotion manager of the Fairbanks Company, New York, Mr. Dodge was more recently connected with The Dort Motor Car Company of Flint, Mich., first as assistant advertising manager with the factory organization and afterward as sales manager of the Cleveland and later the Philadelphia distributing houses.

Ernest V. Beck, president of the newly organized B & R Electrical Supply Company of Denver, Colo., has been identified with the industry in that city for over 20 years and, with the exception of the first few years as a journeyman, all the rest of the time has been with various supply houses. For over 15 years he was with the Hendrie & Bolthoff Manufacturing & Supply Company. When he resigned as a salesman of that firm in 1919, he became secretary and treasurer of the Poindexter Supply Company and two years later



ERNEST V. BECK

organized the Central Electric Supply Company as a branch of one of the Salt Lake City jobbing houses. Now, through his association with James W. Ryall, another prominent figure in the supply business, Denver's ninth electrical jobber has been established. Mr. Beck is a former member of the Advisory Board of the Denver Electrical Cooperative League.

Mrs. Alma E. Hunt, home economist of the Southern Colorado Power Company, Pueblo, Colo., recently won the \$50 prize offered by the Postum Cereal Company for a recipe using one of the products of that company. Several thousand women competed in the contest and the award of judges was confirmed by the staff of Good Housekeeping magazine.

Bayley Hipkins, owner of the Coast Construction Company of San Francisco, Calif., recently paid a visit to Tacoma and Seattle. Mr. Hipkins came north to complete studies of the proposed Lake Cushman hydroelectric power project to be developed by the City of Tacoma, with a view of submitting a proposal for construction. When the proposed municipal project was in its infancy Mr. Hipkins began a study of it and is now completing his investigation.

W. H. McGrath, vice-president, J. B. Howe, general counsel, and D. C. Barnes, manager, of the Seattle division, Puget Sound Power & Light Company, accompanied by Mrs. Barnes, have left Seattle for Boston and New York on business for the company.

E. P. McCaulley and Max M. Eckerman have recently opened a new store at 5723 Santa Monica Boulevard, Los Angeles, Calif. They will do a general retail electrical supply and contracting business.

Rey E. Chatfield, formerly manager of the Electrical Cooperative League of British Columbia, is now assistant to the vice-president of the American Seedless Raisin Company, San Francisco, Calif.

W. H. Whiteside, of the Westinghouse Electric & Manufacturing Company, Pasadena, Calif., was a recent visitor to San Francisco.

E. R. Alton, C. H. Seybert, A. Van de Graaf and Milton G. Kemp, of Ogden, Utah, and L. T. Mayhew, of Los Angeles, Calif., have organized and incorporated the Globe Electric Manufacturing Company, which concern will be located in Ogden. The capital stock of the new company is \$250,000 and the above named men will be directors for the first year. The company is organized to manufacture electrical appliances and to do a general electrical supply business.

Paul A. Douden, formerly of the sales staff of the Western Electric Company, Inc., Denver, Colo., has organized a manufacturers' agency in that city under the name of the Globe Electric Supply Company with headquarters at 1620 Wazee St. Accounts already scheduled by the new firm are those of Federal Electric Company, Redtop Electric Company, Strait & Richards, Standard Electric Stove Company, Betts & Betts and the Joslyn Manufacturing & Supply Company of Chicago. Complete stocks of the last named company will be warehoused in Denver and Salt Lake City. The firm will cover Colorado, Utah, Wyoming and New Mexico.

F. G. Robley, superintendent of water power plants, and A. Drill, chief engineer, of the Portland Railway, Light & Power Company, Portland, Ore., have been in San Francisco, Calif., inspecting the 35,000-hp. Pelton Reaction Turbine which has been built for their company by the Pelton Water Wheel Company, of San Francisco.

C. V. Schneider, one of the leaders of the electrical industry in Sacramento, has been elected president of the Electrical Contractors' and Dealers' Association of Sacramento. "Cass" Schneider started in the electrical business with the Nebraska Telephone Company, of Omaha, Neb., in 1888. Working under one management he occupied positions variously with the Midland Electric Company, the Universal Electric Company and the Western Electrical Supply Company. In 1897 he moved to Sacramento and joined the firm with which he is now connected and which was then known as the Sacramento Electrical Engineering & Supply Company. In 1904 this firm was incorporated under the



C. V. SCHNEIDER

name of the Electrical Supply Company and Mr. Schneider was elected president, which office he has since held. In addition to his other work he was for three years president of the California State Association of Electrical Contractors and Dealers and is active in the affairs of the Sacramento Valley Electrical Association and other associations.

D. J. McCormack, H. E. Popp and H. T. Porter, formerly connected with the hydraulic turbine department of the Wellman-Seaver-Morgan Company, of Cleveland, Ohio, have joined the engineering and sales staff of S. Morgan Smith Company, York, Pa., builders of water power equipment. Mr. McCormack and Mr. Popp are located at the main office and works at York, Pa., while Mr. Porter becomes manager of the branch office at 76 West Monroe Street, Chicago, filling the vacancy caused by the recent death of John C. Temple.

Obituary

Ralph Gilman, electrical engineer in charge of design of alternating current turbine-generators for the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., died suddenly in Los Angeles, Calif., where he had been for some time in an endeavor to regain his health.

Trade Outlook

San Francisco

The holiday season closed with extremely satisfactory sales result. Retail buying in many lines exceeded all previous records and stocks were well disposed of. Electrical appliances were in strong demand and jobbers' stocks on some lines were entirely exhausted. Express shipments to cover the emergency were also absorbed and buying to fill in will necessarily be heavy.

Banking conditions are reported as being satisfactory and loans at a low point. There is money for sound industrial and commercial development.

Building continues in record volume and is well distributed as to class of structure.

General expressions from leaders in important lines of industry and trade are optimistic and the outlook for 1924 is said to be exceptionally good.

Los Angeles

The electrical retail business has been better this year than ever before in this section. While the business was slow in coming, it came just before Christmas with a rush so that local retail merchants enjoyed a very prosperous Christmas season.

Electrical wholesalers experienced the best appliance year in their history, and on a number of appliances they were unable to fulfill the demand. The sale of wiring devices, wire, conduit and supplies fell off somewhat, due to consumers curtailing their buying prior to the first of the year. As the construction business keeps up, there is every indication that this is only temporary and that business in those lines will be excellent early in the new year.

Manufacturers report great activity, while several large orders for extremely heavy equipment have been placed recently. The sale of radio continued, with a much better Christmas than was ordinarily expected, particularly in this line.

The building permits issued for the first fifteen days of December totaled 2,753 with a valuation of \$14,063,671 as against 1,958 permits valued at \$4,575,768 for the same period last year, an approximate increase of 100 per cent in the permits and 350 per cent in valuation.

Seattle

Building, highway and bridge construction throughout the Northwest is reported more active at present than it has been at this season for some years past. Seattle building work is continuing steadily, with work progressing on several large projects, and residence construction unusually active for this period of the year.

In production, sales and shipments, lumber mills of Washington have set a new record, according to advice from the West Coast Lumbermen's Association. This industry is expected to show little depression during the winter, with only a very slight lull for the holiday period.

Electrical jobbers, as a whole, report sales volume very well sustained, with every indication of continuance until after the first of the year. Prices are holding, and stocks ample to meet all requirements. Shipments from the eastern factories are generally satisfactory, and collections are reported from fair to good.

Retailers report an encouraging volume of Christmas sales, with a heavy run on household appliances such as percolators, toaster stoves, lamps and small gift appliances. Electrical novelties and radio equipment moved well, and electric Christmas tree decorations were in demand.

Salt Lake City

The Chamber of Commerce of Salt Lake City recently conducted a five-day drive for funds to be spent in advertising the city of Salt Lake and the state of Utah during 1924. The bogie of \$75,000 was over-subscribed by more than a thousand dollars and there were many thousands of subscribers of small amounts, rather than a few of very large amounts.

The excellent financial condition of Salt Lake City and Utah is reflected in the small amount of rediscounts in the Federal Reserve Bank. These, at the last report, amounted to approximately \$10,000,000 as compared with \$40,000,000 in 1921.

The sugar companies of Utah and Idaho are in good condition this year, with none finding loans necessary, with the exception, perhaps, of short loans to meet beet pay days.

Building activity has somewhat decreased, due to the advent of the winter season.

Christmas business in general showed a substantial increase over last year's figures, and electrical gifts were more in evidence than ever before.

Spokane

Spokane has enjoyed a very prosperous year, with a general improvement realized in every line of business.

The lumber industry is in good condition, considering the season, most of the twenty-five woodworking plants reporting outputs considerably higher than those of last year.

The Washington wool production is the best since 1920, amounting to 4,500,000 lb. This year 500,000 sheep and 300,000 lambs are reported, one of the reasons for the increase in the local packing business. One packer is shipping meat to the Orient and to Germany, as well as to widely scattered domestic points.

Spokane building permits during November amounted to \$181,000, about 20 per cent higher than for November, 1922, due to the open winter. The improvement of 10 to 20 per cent realized this year in electrical jobbing brings conditions back to normal in that line.

Local retailers of electrical appliances have had a splendid holiday season, with an unusually high demand.

Dividends approximating \$3,000,000, including profits of leasing concerns and gold dredging, distributed during 1923 by metalliferous mining corporations of the Inland Empire, including Washington, Idaho, British Columbia and Oregon, indicate a fairly profitable year in the mining industry.

A recent strike at the Old Dominion mine in Stevens County has aroused interest again in eastern Washington as a future mineral territory.

Portland

Construction work is still going on at a good pace throughout Portland, there having been no severe weather recently. This class of work, together with the factories, is absorbing all the skilled men available. There are, however, several thousand unskilled workmen idle, largely from the farms and logging camps. The situation is not considered serious.

In the lumber industry the annual clean-up period is at hand, the cut having fallen in a week from 27 per cent to 17 per cent above normal. The lumber men are closing a year of great activity and good profits.

Of the conditions in Oregon as he recently saw them, B. C. Forbes of the Philadelphia Inquirer wrote that there is hardly a fundamental industry of the state but what is prospering today, and that Oregon was never in a stronger position, from a business standpoint, than it now is.

Denver

Every day for the past month, the realization has become greater that northern Colorado is destined for an oil boom which some experts declare will be the equal of any experienced on the North American continent. A deep gas well brought in early in November drilled itself into the oil sands with an initial flow of 500 barrels and this amount has increased to nearly 5,000 barrels a day. Preparations are now being made to drill about 50 wells in the Wellington district, west of Fort Collins.

Business in northern Colorado has prospered as a result of this activity and Denver supply houses are being called upon for goods which 60 days ago were destined for holdover until the building boom again opened in the spring.

The seasonal curtailment in building, public improvements, transportation, and agriculture has created a moderate surplus of labor, principally of the unskilled variety. However, a considerable portion of this surplus is being absorbed by the Moffat tunnel project, the Lake-side power plant near Boulder, and the newly opened oil field. There is a shortage of metal miners in some sections.

Christmas purchasing, which got off with a slow start, proved superior to all expectations. Never before in the history of the mountain region were so many electrical appliances sold for gifts. Percolators, curling irons, and waffle irons led the demand and all jobbers' stocks of these articles were exhausted several days before Christmas. Toasters and all forms of portable lamps proved exceedingly popular, according to electrical dealers and the department stores.

Journal of Electricity

25 Cents a Copy

January 15, 1924

San Francisco

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Power

Interpretations of the 1923 Code

THE 1923 edition of the National Electrical Code has been issued and is now being distributed. Announcement to this effect was made in the columns of the Journal of Electricity, issue of Dec. 1, 1923.

Owing to the fact that there have been several radical changes in some of the rules and many important additions, there will be numerous questions arising regarding the interpretation of the Code's provisions. The questions have formerly been directed to the National Board of Fire Underwriters or to some of its affiliated organizations; in the case of the Pacific Coast, to the Board of Fire Underwriters of the Pacific.

In the majority of cases, there are many duplications in the requests for information and interpretations, and in many cases the entire industry would benefit from the answers.

Arrangements have been made by the editors of the Journal of Electricity whereby Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, will answer these questions on the Code, giving full interpretation and instructions in the columns of this magazine. A section of the magazine will be devoted to this service.

Mr. Mitchell will be remembered as the author of the series of articles which have recently been published in the Journal of Electricity on the provisions and interpretations of the new Code.

Readers are requested to address inquiries regarding the Code and its rules to Mr. Mitchell or to The Editor, Journal of Electricity, 883 Mission St., San Francisco, Calif. If immediate answer is required, it will be necessary to indicate this fact in the inquiry, in which case reply will be made by return mail.

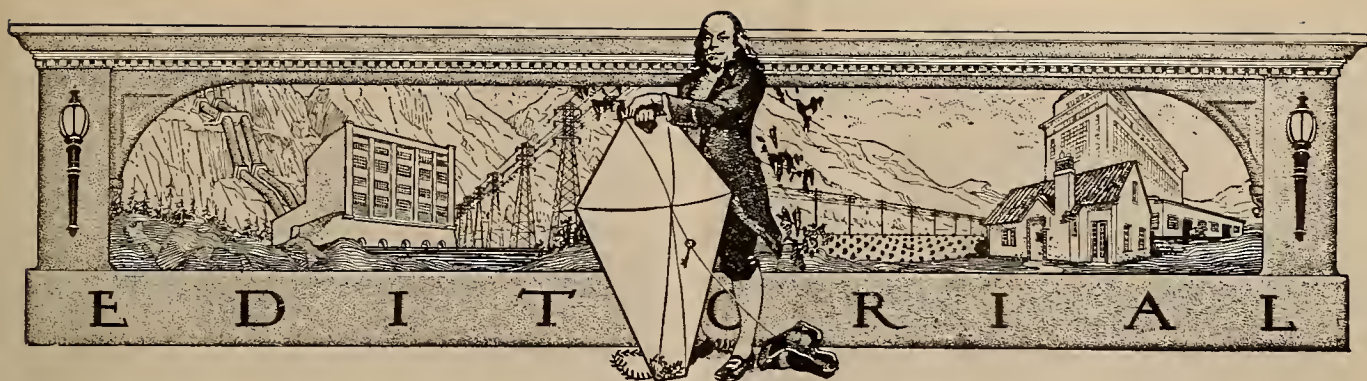


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A Key Link in the Chain

WHENEVER interest palls in the income tax, the soldier bonus, the Ruhr situation, or the eighteenth amendment, it is the conventional thing to break forth into diatribes against the middle-man.

AMATEUR economists entertain themselves and others with schemes demanding his elimination from the body politic. He is a parasite; he performs no useful nor productive function; he is a blemish on the face of industry; in short, let us wipe him from the industrial slate, and down will go the Demon H.C.L.

IN spite of all these onslaughts, the middle-man, the jobber in other words, continues to job. His elimination is slower in coming than twenty pounds of sugar for a dollar. This prompts the observation that if the jobber were all or any of the things that the amateur economist has said about him, he would have ceased to exist long before this.

ELSEWHERE in this issue, there is an article which tells what a jobber is, what he does, something of his responsibilities, something of his cares and difficulties. We hope that everybody will read, and learn, something of the jobber's functions, and of the useful part that he plays in the distribution of electrical products.

"THE jobber faces two ways," says this article. The truth of this is self-evident. He turns toward the manufacturer, toward the many manufacturers, on the one hand, and on the other toward the dealer. He bears a definite responsibility to each, and his function in both cases is such that neither could, or has been able to get along without him.

THERE are literally thousands of small, independent manufacturers of electrical specialties, who would be utterly unable to market nationally at all, without the intervention of the middle-man who presents the most efficient, and at the same time the cheapest stepping-stone between the manufacturer and the retailer that has thus far been devised.

THE jobber serves to reduce, rather than increase our old menace, the H.C.L. His method of distribution is far cheaper than anything that could be devised by the average small manufacturer working individually. His assumption of the normal credit risk in itself places him almost in the role of banker, as well as guide, counselor and friend to the retailer.

"ONE easy step," as between the average manufacturer and consumer, without any intermediary, is a beautiful theory wrecked upon the fact of economic law.

As We Teach in the Schools

Today, So Will the Next Generation Think

NEW Mexico, Colorado and Wyoming are blazing a trail in educational work that may well be followed by other Western states. According to figures compiled by the Rocky Mountain Committee on Public Utility Information, there are nearly one hundred high schools in the above-mentioned states in which the students are learning of the history and magnitude of the public utility business.

Officials of the various public utilities assume the role of lecturers, and appear in the classrooms, telling the story of public service.

This is a most interesting innovation in the new art, or science of public relations. The school authorities are no less concerned than the students. In some cases, complete series of lectures have been arranged, touching upon the many phases of gas, electric, telephone, and street railway enterprises.

In order to stimulate interest, a number of the utilities have offered prizes for student essays. These range from substantial cash sums to electrical appliances.

This general educational movement started in the colleges and universities, where lectures on the economics and social structure of the public utilities have been offered to undergraduates in various classes.

That electricity is destined to become perhaps the greatest factor influencing our daily lives is not too much to be said. What movement could be more beneficial or constructive than to bring about at least the rudiments of an understanding of the many factors that go to make up the modern public utility, especially among the rising generation? They will be the legislators, the regulating body, the operating and technical heads, as well as the voters of tomorrow. The quicker the young idea knows how to shoot, the greater the chance that he may select his mark with discrimination and hit it in the bull's-eye.

Where Municipal Ownership

Invariably Hits a Snag

ONE of the problems of utility development which is receiving serious consideration on the part of executives, particularly here in the fast growing West, is that of service extensions. It is no unusual thing, in fact it is a common thing, for the cost of extensions to run into many millions of dollars each year. The estimated expenditure of a southern California telephone company for line extensions to care for new customers is announced as \$19,000,000 for 1924. The extension program for any of the major western electrical utilities will show a condition analogous in every respect. And in most cases these expenditures are not immediately productive, but must be made in order to provide for future business.

Public ownership schemes are prone to overlook this important feature. It has come to our attention that one municipal railway is financing its extensions from depreciation reserves, while another publicly owned and operated electric utility is reported to be so far behind in the necessary finances for line ex-

tensions that many of these extensions are made only when the property owners seeking service will advance sufficient funds to pay the bills.

The people generally are loath to grant the politicians the right to spend money for something in the future. And the politicians are even more loath to spend money unless they can see votes which will either maintain them in office or secure more funds for public expenditure. Privately owned corporations, on the other hand, proceed with a vision of ultimate service and of community development, with a view at all times to provide service in order that it may be at hand when needed.

If Arithmetic Won't Solve

This Problem, Try Algebra

PUBLIC ownership propagandists have been accustomed to dissert at length upon the "enormous" profits of the utility business, pointing with a greedy and jealous hand to the operating revenue which the annual reports show. They pay no heed to taxes, depreciation reserves, maintenance and extension funds and other heavy income-reducing factors. Nor do they even approach an attitude of fairness, for they persistently deny that publicly owned utilities should bear their share of the tax burden of the state or community, and they abhor the idea of rate regulation for such properties. Without equal operating restrictions there can be, of course, no equality of comparison of results. The public should be impressed with the idea that comparisons of rates and service in cities where municipal ownership prevails, with cities where private operation under public regulation obtains, is meaningless. Such comparisons have no more sense than the schoolboy's statement that because "a man and a half digs a hole and a half in a day and a half, then six apples must cost ten cents."

Eat Toast, Only

Make It Electrically

UNDER the direction of the Wheat Council of the United States there is being conducted a national toast campaign, urging more people to eat toast. Many allied food groups are actively cooperating in this campaign. The electrical interests, including central stations, manufacturers, jobbers and dealers are also participating in the drive. Altogether there are twenty different groups of business tying into the campaign.

The advertising of the bakers, grocers, yeast manufacturers, restaurants, creamery companies and many others creates a big demand for toasting appliances. Such an opportunity for bringing electric toasters before the public with a smashing union of advertising forces, has seldom, if ever, been afforded the electrical industry.

The argument so far as this industry is concerned is this: "Every wired home should have hot toast on the table. Toast it electrically." In many localities the electrical interests have taken advantage of this opportunity, have cooperated with bakers

and others and have sold toasters. To give some idea of the tremendous force behind such a campaign, something like 50,000 toasters were sold in a few of the larger eastern cities. Here in the West such campaigns have been put on in only one or two cities.

With the Wheat Council bringing bakers' wagons, grocers' windows, newspaper and magazine pages, billboards, etc., with all their advertising power into one associated effort to tell the public about toast and its many uses, much toaster business will result.

Every electrical dealer and central station has an opportunity in this campaign. "Eat More Toast" is being heralded in every nook and corner of the country. Line up the allied interests in your community and put on a "drive" locally. Put an electric toaster in every home in your city.

Electricity Has Had an Important Role in Expanding Human Service

THE extent to which inventive genius, making possible enlarged production per worker, has stimulated industrial production in America was recently discussed by Julius H. Barnes, president of the Chamber of Commerce of the United States. Among other things, Mr. Barnes pointed out that in the steel industry, one or two men with mechanical unloaders, replace twelve to twenty unloading by hand; in the clothing industry, six men operating two boarding machines replace twenty; in the glass industry one bottle making machine replaces 54 workers and in coal mining an automatic conveyor with twelve men replaces 150. These are but a few of the instances which were cited in industries ranging from the production of steel to bread baking and the manufacture of books. One point which Mr. Barnes overlooked is the application of electricity to this machinery, an application which is directly responsible in many instances for the great saving in manpower. Few other factors have had a more important bearing on social relations or done more toward raising the economic status of the country than has the development of a cheap and abundant supply of electric power.

We Can Be Sure of Nothing Except Death and Taxes—Especially Taxes

SENATOR BORAH, in a recently published interview, remarked in effect, that the question of soldier bonus was inseparably connected with that of taxation. In other words, that none could be consistently for soldier bonus, and, at the same time, for a reduction in our income taxes.

The vital point raised by Senator Borah was that whatever is done, somebody must pay the bill. This disagreeable little fact is one of the greatest stumbling blocks in the way of government-owned and operated public utilities, and, incidentally, is a point that the most perfervid orators in favor of such action touch upon not at all.

Sooner or later, we hope sooner, steps will be taken to remove certain if not all securities of government issue from the tax-free list. It has been

proved many times that such securities make for almost unlimited extravagance in alleged civic improvements, and, at the same time, reduce tax receipts and place a definite restraint upon the progress of industrial development.

Mr. Mellon has called attention to the reduction of tax rates as a means of producing more rather than less revenue from taxation. This seeming incongruity is an established fact, however, in merchandising anything; witness the Ford motor car, as a case in point.

"Let us tax the g-r-r-eat, and g-r-r-aspig power companies that sap the life blood of the poor," says the soap box orator, with fine fury and frantic gesticulation, hoping that his audience may be deluded into the belief that such a course will produce lower rates for light and power. If he would howl for lower taxes, which would permit lower rates, that in turn would increase consumption, he would be talking a certain amount of sense. But then, if he did that, he would no longer be a politician.

Need for Standardization of Electrical Appliances

MANUFACTURERS have spent many millions for appliance design and construction. Countless dollars have been spent in promotion, not only of apparatus already manufactured and standardized, but in bringing out new styles and types of apparatus. Very often these new styles and types have almost duplicated existing models.

This has resulted in a long line of models, duplication of sales and publicity effort, increased manufacturing and promotion expense and higher cost to the dealer and consumer. A barrier has been erected against the ready sale of certain appliances, sales have suffered and, in many cases, the effect has been unprofitable or disastrous for manufacturers who have been compelled to absorb heavy replacement or adjustment losses.

While all this has been going on, the public and the dealer—who is really the medium of communication between the public and the manufacturer—have been clamoring, on the one hand for lower prices of appliances, and, on the other hand, for increased profits.

In mapping out production and other plans for the new year it may be well for manufacturers to give heed to this phase of their business and to consider if there is not a possibility of eliminating certain stock numbers which are, in effect at least, duplications of other numbers. This will result in lowered costs of manufacture due to increased production of the remaining models, will remove the necessity for carrying increased numbers of parts for repair or replacement, will help to reduce sales and other attendant expenses, will keep jobbers' and dealers' stocks in healthier condition and will increase turnover. At a time when other industries are working toward standardization as a means for decreasing manufacturing costs, it would seem well for the manufacturer of electrical appliances to do likewise.

CURRENT COMMENT



It is a far cry from fish to kilowatts, but perhaps some imaginative member of the electrical industry can prove that the newly discovered fish described

When Electricity Is Used to Light the Fish

in the editorial below derives the power which illuminates it from some of California's hydroelectric energy. Its shouting may also be ascribed to radio. Because it serves to indicate the extent to which California and the West in general has advertised itself, and because it is certain to give the reader an opportunity to smile, if not to laugh, it is reprinted here. The editorial is taken from the New York Times.

California, which gave the world the one-piece bathing suit and made the bathing girl an institution without which no home is complete, has just produced another marine marvel. Its name, according to a professor who described it to the Federation of American Societies for Experimental Biology, is *poric thysnatatus*, but it is better known to its neighbors as the Illuminated Shouting Fish.

Without wishing to invade the field of biologists, or to attempt profane explanation of the slow mysteries of evolution, one may hazard the guess that this was a mere fish, dark and silent like most other fish, in the old Spanish days before the arrival of those who became the first American Californians. From his retreat in the coastal waters the fish saw what happened to the leisured Spanish rancheros, who were content to be worthy without advertising their worth to the universe. Where are they now? *Poric thysnatatus*, discovering that only the fittest survive, put on protective coloring and adapted himself to the changing times in California. Now he swims about wearing 350 gleaming phosphorescent lights, like a Hudson River boat. No Californian ever hid his candle under a bushel, not even a California fish.

But light alone is not enough. All the senses must be assaulted. *Poric thysnatatus*, the professor tells us, shouts violently as it leaps on the little fish and consumes them. The lesson of the California realtor is not in vain. California is a great state for people who can adapt themselves to their environment, but it is no place for little fish.

There are grounds for the grave fears expressed by certain members of the electrical industry that the public, unless properly informed, will grasp a wrong

Misinformation Regarding Superpower

interpretation of the superpower agitation that is sweeping the country. While there has been considerable newspaper comment about this movement in the municipal ownership journals, there has been little or nothing about the benefits which will accrue from the interconnection of the existing power systems. Some idea of the misinformation which is being placed in the hands of the public by uninformed and dictatorial newspapers may be gained from the following quotations from an editorial which appeared almost simultaneously and with but few changes in the San Francisco Examiner, the Los Angeles Examiner and the Seattle Post-Intelligencer:

There is a movement well advanced, in Washington, in California and throughout the United States, which thoughtful people will regard with fear.

A combination of all the electric power concerns in the United States into one Supersystem.

The "superpower" movement is real. It is discussed in every meeting of electrical engineers, and is declared to be—from the point of view of giant finance—entirely practicable. It has passed the first stages of whispering, of inner-circle discussion, and is now beginning to emerge in the form of veiled propaganda printed in commercial and technical publications.

Readers need not be told that the superpower trust would be immeasurably the hugest trust ever organized!

It would be as much greater than, for instance, Standard Oil, as Standard Oil (regarded as a unit) is greater than some back-yard petroleum concern.

Such a trust would hold America's manufacturing, America's irrigation, America's transportation, America's residential development, in the hollow of its hand as Goliath might have held four pebbles from David's sling.

Physically, the plan calls for a linking of the main power lines of all private power companies, so that electricity, generated at a thousand points, could pass back and forth from system to system, supplying America's whole usage of electricity from a single national spider-web of wires.

The public will be the fly in that spider-web.

And it may here be stated that such a linking is easy to achieve.

It WAS achieved, in many states of the Union, notably California, during the war, by federal order.

It IS achieved, in part, in several Far Western states today, in Washington, through the system of interconnection by which "rival" private companies supply each other mutually with what is called "stand-by" service. All that is needed is an extension of such connections.

A recent issue of Public Opinion, a weekly bulletin frankly devoted to propaganda for power companies and other utility corporations of this state, says:

It already exists in the Northwest. When the systems of the Puget Sound Power & Light Company, the Washington Water Power Company, the Pacific Power & Light Company and the Montana Power Company effected interconnection, as they have done, a great superpower was created in the Pacific Northwest, stretching a thousand miles east and west with 5,000 miles of transmission lines and a combined capacity of 500,000 horsepower. The Northwestern states are already superpower states.

Financially, such a supertrust will be, to put it plainly, the most terrible money tyrant—the most appallingly all-dominating dictator of stock markets and bond markets, of banks and credit, of politics and the press, of human thought and human life itself—that this little world has ever seen.

The "Superpower" movement is afoot.

It can be opposed, can be halted, can be frustrated only by one thing—public ownership of water and power.

The first overt propaganda, now being spread, looks toward the formation of regional supertrust units that can later combine. And—

The first of these units, as scheduled by the power interests, is to be the Pacific Coast.

Read, as an indication, the leading article in the Commerce Monthly for December, 1923; said monthly being published by the National Bank of Commerce in New York. The article is entitled: "Industrial Development of the Pacific Coast." After bringing out the fact that this Coast has little coal, the article proceeds:

Superpower is now the hope of industry beyond the Rockies. Sufficient hydroelectric energy for all probable industrial demands is at least in sight, if not yet developed.

Water power is already harnessed with an inter-connecting network from Oregon to California to create a reservoir of electricity supplying many communities. * * * Forty per cent of the potential water power of the United States is in the Pacific division and thirty per cent in the mountain division.

And in the publication of a bond house with New York connections, under date of Dec. 10, 1923, we find a bitter attack against public ownership of power:

The private corporation has always and inevitably an advantage in production costs that will far more than counterbalance the supposed benefits of "sale at cost" so loudly brayed about. * * * The battle will never finally be won until the public is educated.

Educated—to what?

To look submissively on while already huge private power interests merge into the "superpower" octopus for perpetual profits, perpetual dominion, a perpetual orgy of superfinance!

This is the dizziest dream ever dreamed by the kings of wealth.

The one thing that can prevent that dream from coming true is Public Ownership of water and power. And delay means defeat.

The electrical press and the electrical industry have made the statement that customer ownership offers a practical solution to the municipal and government ownership problem. It should be gratifying to note that the idea has been taken up by the press and it is to be hoped that the public itself will soon recognize the possibilities of such ownership. The following editorial is taken from the Los Angeles Times where it appeared under the title of "Popular Ownership."

To have a direct interest in the heat and light and power and transportation, so essential to every citizen in modern life, is a laudable ambition. How can he best realize it?

Professional politicians would have the people believe that government ownership or state ownership or municipal ownership affords the private citizen the best method for acquiring such possession. They have harped so constantly on this theme that many suppose the consumer has no chance to share in a public utility except through the philanthropy of the professional politician.

But is this so? No matter of public polity deserves more earnest consideration. For on the efficient development and impartial distribution of the mighty forces of nature—especially in the form of electrical transmission—hangs the economic future of our country.

In a democratic community the ownership of conveniences used by everyone should be placed on a popular basis. This should be done as far as is compatible with sound business management. But when the politician comes in through the door business goes out at the window.

Therefore, we must discover some better way than state ownership for placing the control of public utilities in the hands of the people, so as to bring the greatest good to the greatest number. That way has already been found and is being universally extended.

Private ownership of public utilities is today as much a contradiction in fact as it is in terms. Consumers can own—and to a large extent do own—the heat and light and power and transportation systems that the advocates of political ownership still persist in calling the property of private corporations.

Moreover, they can own them in a broader and more satisfactory manner than by handing them over to the cliques and rings that control municipal and state governments. They can own them directly as shareholders instead of indirectly as voters; they can own them from the inside, instead of from the outside.

In California the big public utility companies have long had a program for taking the public into their confidence.

The idea has been so popular that it has spread across the continent. Whatever desire there may have been prior to this for municipal ownership is fast fading before the better plan of cooperation.

The public utility companies of California offer the consumer a share in their ventures on terms within the reach of every worker. The shares are as low as \$100 each and may be paid for on the installment plan. In fact, to become a part owner—however humble a one—in the big hydroelectric enterprises of the West is no more difficult than starting a savings account.

Thus the people as a whole are becoming the corporations denounced by the politicians who favor the more restricted municipal or state ownership. When every man or woman who uses heat or light or power owns a share in the plant that produces it the politicians will have a difficult job to persuade them to abandon their property to any state or city government.

And there are very few consumers in Los Angeles who could not afford to buy a share in a public utility corporation on the installment plan.

It would seem that the rural districts and smaller communities will be forced to assume a severe handicap as the result of the municipal ownership projects which are being launched in some of the cities on the Pacific Coast. In allowing such ventures to go through without protest these districts are overlooking the item of increased taxation which will ultimately result.

If the properties of a public service corporation which are not only taxable but also heavily taxed, are taken from private hands and placed under municipal control, they are immediately placed in the tax exempt class. The revenue which goes to the county and state government must then be derived from another source. The logical victim is the general public. While those in the city which has municipal ownership pay their share of the increased taxes, the citizens in districts which do not receive power from the municipal plant must help pay the bill. This point is admirably brought out in a recent editorial in the Lynden (Wash.) Tribune. The editorial follows:

Us country jacks don't get a chance to vote on Bellingham's proposal to take over its lighting plant, but we are directly interested. If the plant becomes a municipal one, it will be dropped from the tax rolls, and county levies will go up proportionately. We'll pay higher taxes without having any vote in the matter just now.

The Puget Sound Power & Light Company in 1922 paid \$55,037.77 in taxes on its Whatcom County properties, approximately one-fifth of the current expense budget of the county. It is now paying more taxes into the treasury of Whatcom County than any other property owner, exclusive of trans-continental railroads.

Whether Bellingham benefits from such a move or not, it is easy to see the loss that the country districts will suffer by making such properties tax-exempt. Seattle's venture into the street railway field meant a deduction of millions from King County's tax roll, and an increase of levies for the farmers of that county who are benefited not a penny's worth by the fact that Seattle folk now pay more than eight cents for a five cent ride on their own system, which is now operating under a million dollar deficit. The fifty million dollar investment of the City of Seattle on its power plant in Whatcom County would be a healthy addition to our assessed valuation if the project were not tax-exempt.

All of which leads us to the conclusion that if a group of citizens of this state, whether banded together in a city or as stockholders in a corporation, wish to purchase and operate valuable properties, they should pay taxes on them in fairness to the other group of citizens. A ringing demand to this end should be presented by the country districts to the next legislature.

Practical Public Ownership of Power Utilities

The Farmer and Municipal Ownership

Smile

SERVICE with a smile,—there is a goal to be attained by the electrical industry, which, once reached, will give it a rightful place in the sun, secure in the hearts and minds of the public. These smiling, courteous officials are truly representative of the electrical industry of today. Each smile connotes pleasure in serving the public. This pleasure of service is the keynote of his public relations. It is not surprising, therefore, that the people, in response, carry home with them the agreeable flavor of good will. They bring him their business again. And when one impugns his motives or threatens his welfare, they take his part and defend his cause because they have confidence in his fairness and good intent.

How much better is a smiling countenance than one masked in a Napoleonic frown. It breathes the spirit of sunshine, good fellowship, tolerance of the other fellow. It smoothes out misunderstandings, spreading human kindness among all those with whom it comes in contact, whether fellow worker on the inside or customer on the outside.

This winning by a smile is a truly human method of success,—a method worthy of adoption by all of us, so smile, bless you, SMILE!



The Courteous Service Club Movement

By R. A. Balzari

Manager, Industrial Department,
Westinghouse Electric & Manufacturing Company, San Francisco

SERIOUS consideration of public relations is a comparatively recent innovation within industrial organizations. It is a great many years since the late Commodore Vanderbilt enunciated his own ideas as to public relations with the expressive if inelegant phrase, "The public be damned." The public, however, refuses to do anything of the sort, as the old-time reactionary has learned to his cost.

"The public be pleased," is the modern transposition of the public relations idea of three or four decades ago. So firmly has this latter idea taken root and so constructive has it proved to be that practically all great business and industrial enterprises have organized departments in the hands of specialists whose business it is to study the question of public relations in all of its dips, spurs and angles in order that the industry itself may discharge to the utmost its responsibilities to those whom it serves.

The Pacific Coast Electrical Association has a committee on public relations. This committee in turn has a sub-committee on employees' relations. The purpose of this committee is to point out ways and means whereby employees within the electrical industry can do their part in furthering the cause of better relations with the public. This committee has evolved an idea, which, if carried through to full fruition, cannot fail to have a marked influence upon the electrical industry in the West. This idea is not new; no new basic principle has been discovered; it has been rather in the way of directing renewed attention to something that has been with us always, to bring that something into greater prominence and to bring about a realization of what a splendid asset that something is to everybody who uses it. The particular something in question is the Smile. "Always with a smile" is the slogan of the Courteous Service Club. The message to everybody within the industry whom it is hoped to enroll in the club is expressed in the first circular as follows: "You can make yourself a better man, your business a better business, your craft a better craft, and your city and country a better place in which to live."

It is proposed, therefore, to organize a Courteous Service Club to which everybody and anybody within the electrical industry or contributing to the electrical industry is eligible for membership. There is no initiation fee and there are no dues. The obligation placed upon members is moral and psychological. The committee has prepared a descriptive circular,

THE Pacific Coast Electrical Association has devised a plan to capitalize upon the smile as a means of bettering public relations. It plans to organize a Courteous Service Club the membership of which will include every member of the electrical industry in California. In this article Mr. Balzari describes the program which has been prepared.

an enrollment blank and a membership card. There are 25,000 people engaged in the electrical industry in California alone. Ways and means are to be taken to bring the Smiles Campaign to the attention of every one of them in order that he or she may sign the enrollment blank, take out a membership card and become an active member of

the Courteous Service Club, through the operation of which it is hoped to make the electrical industry in the West famous throughout the world as one wherein uniform courtesy toward one another and toward the public will always be observed.

Plans are under way whereby employees and central stations will have the Courteous Service Club brought to their attention through their various employees' associations. Descriptive material, enrollment blanks, membership cards in ample number, together with membership buttons will be sent to the employees' associations so that they may obtain nothing less than a 100 per cent enrollment in this great movement. Employees and associations of all manufacturers and jobbers will be reached through their associations by the same method, as is also true of electrical contractor-dealers who are affiliated with contractor-dealer associations. Electrical clubs and development leagues will be served with the literature and other material pertaining to this movement through committees within their own organizations. Contractor-dealers and other members of the electrical industry who have not been affiliated with any of the organizations mentioned above will be reached through jobber's salesmen, who in the course of their regular calls will draw attention to the Courteous Service Club movement.

In order to add zest and enthusiasm, a contest is to be inaugurated between the Los Angeles Electric Club and the San Francisco Electrical Development League by which a trophy will be presented to the club obtaining the highest percentage of members. This idea in turn will be presented before the membership of both of these organizations at meetings called for this purpose in the near future. Other organizations within the electrical industry will be used for spreading the idea. These will include the Oakland Electric Club, the San Diego Electric Club, the Long Beach Electric Club, the Sacramento Valley Electrical Society and the Santa Clara Valley Electric Development League.

The initial cost of preparing the printed matter, circulars, enrollment blanks, membership cards and membership buttons has been borne by the Pacific

What you as a member can do —

You can make yourself a better person, your business a better business, your craft a better craft—your city and country a better place to live. Ours is an industry based on service. No matter what the executives may do, the service is measured by the attitude of the man who meets the public. It's the man at the counter—the man who comes in contact with the public, who determines our success in serving our fellow men. Service with a smile—there is a goal worth while.

As a member of the Courteous Service Club you can determine that every outsider who has dealings with you will go away feeling that the electrical industry is the most courteous in the world.

You can meet the public with a smile on your face that will make friends for you and your company—a smile that will prove that yours is a service of which the community may well be proud.

You can cultivate that good-natured disposition which will make you a favorite among your fellow workers.

He is worth more who does something as a private than he who does nothing at the head of an army.

Just so, though your work may seem unimportant, if you do it well and with courtesy it becomes more important than a greater task poorly and discourteously performed.

If you believe in your work, your fellow man and yourself, become a member and do your bit to make the electrical industry the *courtesy* industry.

Courteous Service Club

Always with a Smile

-a Big Job

from

to

Always with a Smile

Enrollment Blank

"Always with a Smile"

I believe the Courteous Service Club will be of great value to me and every fellow worker in the Electrical Industry—and hereby enroll myself as a member and pledge myself to secure other members to this Club.

No Enrollment Fee
No Dues

Name _____

Co. _____

Address _____

Enrolled by: _____

"Always with a Smile"
This is to certify that

is a LIFE MEMBER of the Electrical Industry's COURTEOUS SERVICE CLUB.

W. J. [Signature]

SAMPLES of some of the literature to be used in connection with the Smiles Campaign of the Pacific Coast Electrical Association. Above and below is the folder describing the Courteous Service Club and its aims. In the center are facsimiles of the enrollment blank and membership card of the Club.

The world has too much of this,



Let's change it to this in the Electrical Industry



Always with a Smile

"Always with a Smile" That's the object of the Electrical Industry's Courteous Service Club

"A 100% COURTEOUS industry." That's what they'll say of the electrical industry when every man and woman working in this great field is an active and acting member of the COURTEOUS SERVICE CLUB.

It's easy to gain and keep up a membership. A sunny countenance will pay your initiation fee and a smile will pay your dues.

What the electrical industry needs is big-hearted, broad-minded, whole-souled, frown-free men of energy and action who can look a city or a man squarely in the face and smile.

"He profits most who serves best." And he serves best and profits most himself, who does a worthy work well and shows himself friendly to all he meets.

Courtesy is a habit. The habit of being useful, good-natured and gentlemanly. It smooths over the rough places, cools anger, dispels criticism and builds good will. It makes life easier for yourself, those who work with you and those you serve.

It isn't hard to be courteous and cheerful. In fact it's the easiest way. It takes 48 mus-

cles to frown and only 14 to smile, so why be grouchy and wear yourself out?

Keep the frown off your face. It is a symptom of a lack of will-power. A smile is the symbol of a purpose worked out.

We're not talking about a smirk, or a grin. We mean a real red-blooded smile that comes only from those who have confidence in themselves and their work and are so glad of it that they have to let the rest of the world know it.

A smile is cooler in summer and warmer in winter than a frown. To be grouchy is to be shunned and disliked, to be good-natured is to be popular, to be popular is to be noticed—to stand out from the crowd—to be successful.

We all have to work in this old world so why not get all the kick we can out of it? Why not go smiling through the day's work, moving forward and making friends as we go?

And remember, too:

*"It's easy enough to be happy
When life runs along like a song
But the man worth while,
Is the man with a smile
When everything goes dead wrong"*

Coast Electrical Association from that portion of their budget allocated to public relations work.

Posters also are to be provided for placing on the walls in the places of business of electrical concerns of all kinds as a reminder that the Smiles Campaign is not a temporary movement to go up like a rocket and come down like a stick, but it is hoped that the idea itself will so impress itself upon the minds of everybody that the courtesy idea expressed through the smiling countenance as an indication of

his or her pleasure in rendering the service, may become an integral part and an outstanding characteristic of the electrical industry.

Smile and the world smiles with you; grouch and you will be alone!

All who enroll as members of the club will be supplied with a small red button showing the smiling half-moon face and these buttons are to be worn during the entire campaign. These buttons are to be reminders of the club members' obligations.

Store Arrangement Aids in Merchandising Electrical Appliances

By D. D. McFarlane

Sales Manager, Newbery Electric Corporation, Los Angeles, Calif.

DURING the last few years the merchandising of electrical appliances has been developed to a greater degree than it had been in the previous fifteen years. This is particularly in evidence in southern California, and it is with pleasure that we note the opening in every town and city of carefully planned and beautifully appointed electrical stores. First and most important, perhaps, are the store windows, as it is necessary first to get the customers' attention. Naturally, the size and plan of the building affect the particular shape, or design of the windows, but some principles remain the same and will be necessary in the design of all window displays. In displaying electrical goods the floor of the window should be about 16 in. above the sidewalk level. This allows the smaller articles—such as irons, percolators, toasters, etc., to make a good display in the front window, while similar articles may be displayed on pedestals in the back of the window to build up and complete the display. Also, this height of floor will be found to be correct for displaying larger articles, such as vacuum cleaners, fans, heaters and even washers and ironers.

Oak floors in natural finish are perhaps the best kind to use, as dark plush drapes, needed to display the nickel goods, show good contrast on light oak.

Proper lighting is most essential, and care should be taken to see that the light is evenly distributed, with provisions for color lighting and spot lights. Arrangements should be made for plenty of light—about 200 or 300 watts per sq. ft. would be correct for this class of merchandise. An ample number of duplex convenience outlets should be installed in the windows in order to permit operation of devices on display.

Next comes the entrance to the store, which should be inviting. The doorway should be wide and with as little slope as possible and by all means any step up should be avoided. The appearance of the store as the customer first enters is the next important thing to consider. The general layout should be properly balanced so that it does not have the appearance of having all the display on one side.

An excellent example of a well arranged store is that of the Newbery Electric Corporation, Los Angeles. The following explanation of this store and the manner of display, with some of the reasons for so doing, will be interesting to all dealers.

The store is 21 ft. wide by 100 ft. long, and as will be noted by the picture, the windows are 17 ft.

***T** HIS article should be of considerable assistance to those who contemplate the opening or the rebuilding of an electrical store. Mr. McFarlane has had many years of experience in store management and has embodied in this paper the practical knowledge which he has gained and which he offers as a guide to others for store arrangement.*

deep from the sidewalk, and average 6 ft. from glass to side walls, which leaves an 8-ft. entrance.

The wall cases were placed on the left side of the store, because a row of pillars was on that side and the wall cases to some degree covered them up. Some store planners claim that the display cases and wall

cases should be on the right-hand side as most people turn to the right and look to the right on entering a store. However, this arrangement has not proved disadvantageous. In front of the wall cases were placed glass display cases, leaving a 32-in. aisle for serving.

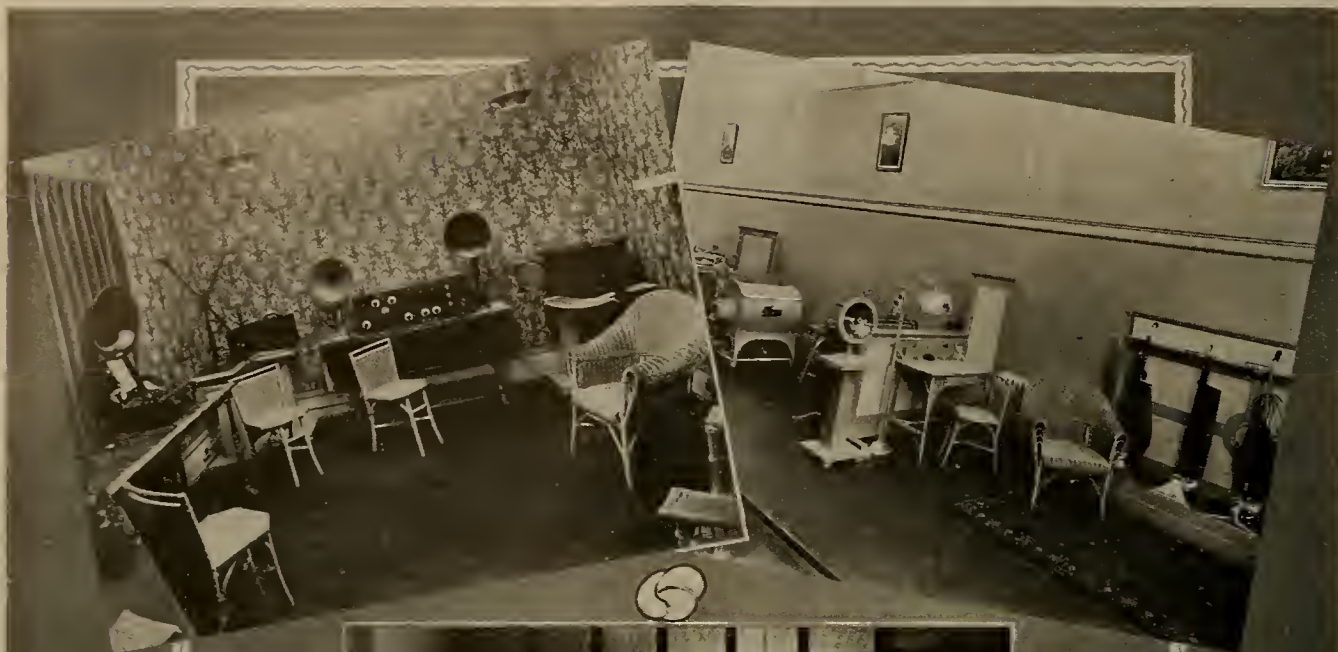
The first 17 ft. of glass wall cases is for the display of percolators, toasters, grills, and the like, with a display case directly in front, containing irons, heating pads, waffle irons, etc., so that all this class of merchandise is confined in one section. Next is the lamp section, with a display case in front of it, containing sockets, plugs, fuses, and all small articles. This case is divided into sixty small compartments, which, as may be seen by the photo, makes a handy and attractive display of the much sought after odds and ends—the names of which the customer never can remember.

The third section is for the display of radio sets, loud speakers, and other bulky radio goods, with a show case in front showing the smaller but expensive radio parts, such as variocouplers, variometers, meters, transformers, etc.

In the fourth and last section are displayed and carried for stock small radio parts, such as tubes, transformers, batteries, sockets, etc., and in the case in front of this section are sixty small compartments for the very small radio parts.

The pillars referred to before divide each section and in front of each was placed a mirror door; odds and ends, such as iron cords, etc., are kept behind the doors. In the above described display all articles are under glass, so that much of the labor of keeping the display clean has been eliminated.

The right-hand side is used for the display of the larger appliances. To balance the store this side was divided by using low portable partitions, extending 6 ft. from the wall at positions directly opposite each division on the left-hand side. The first division is used for demonstrating vacuum cleaners; the second section is for washing machines; the third for ironers; the fourth for ranges. This, briefly, is a description of the store planning. The reasons for this particular arrangement follow:



AN inviting entrance and attractive merchandise display have been arranged by the Newbery Electric Corporation at their new store in Los Angeles, Calif. The store arrangement facilitates business operations.



First, a store should be symmetrical, or in balance, with all cases placed directly in line and equally spaced. This applies to all classes of merchandise. The placing of the percolators and nickel goods in the first section is to create a favorable impression upon entering the store; also, it shows from the sidewalk, and makes the store more attractive.

The lamp section next: As this is about the only repeat line the electrical merchant has, it should be placed back so that the customer will have to pass other lines when entering and leaving. The slogan of the Edison Lamp Works has proved true in all electrical stores—"All the window some of the time, and some of the window all the time." This should be remembered and put into use. The possibilities of developing lamp sales seem almost without limit. Numerous ingenious plans have been worked out by enterprising dealers and their success written in increased profits. Every wired building is a prospective customer for lamps and the tendency is to buy in package lots, rather than one or two at a time. This reduces the dealer's handling charge and therefore increases his profit. It is rarely more difficult to sell a carton of lamps than it is to sell one single lamp. The effect on a dealer's profits is best realized by those who have devoted special attention to this part of their sales.

The radio department was placed at the rear, because this is an electrical store and the public regards it as an exclusive electrical store and not as a store with electrical goods as a side line. Radio being electrical merchandise, it should be handled by the electrical store; if properly handled it will greatly help the electrical dealer in building up his store trade. It is a new line and will require selling different from that used in handling the merchandise dealers have sold for years. Electrical merchandise is a labor-saving line; it has always been sold with that idea uppermost in one's mind. The radio line is an educational as well as an entertaining line of merchandise and the appeal to the customer must be made in that direction. Radio merchandising has now developed into two separate and distinct classes of business—first, the parts business and, second, the completed set business. They are entirely different in nature and must be classed separately, and, where possible, sold by different sales people.

The reason for this is that the parts buyer is a different class of customer from the completed sets buyer and looks upon radio from a much different angle. He is of the inventive, scientific type, who knows the parts, their values and uses; the parts salesman, then, must also be of this type so that he can understand his customer and assist him in designing his set and explaining the results he should obtain.

The completed set buyer sees radio in a different light, and he is not interested in what makes the set work, but in what results he will obtain in entertainment, educational value, tone quality, ease of operation, etc. For him technical names of parts must be left out of the sales talk; therefore it is necessary to have a salesman who can see his viewpoint and forget what is inside the completed set. The separation of the two lines is necessary, and makes selling

for each department much easier. The display of completed sets is in a separate room, as shown in the accompanying picture, and has proved very satisfactory. In this room each set is connected and ready to tune in, so that a demonstration of actual results of receiving can be had on each and every type of set on display.

The larger electrical appliances should be displayed connected and ready for operative demonstration. This does not mean that clothes must be washed and ironed, food baked, dishes washed, etc., in the store, but all appliances should be ready to prove that they will run and work properly. For this reason there are connected and ready for use vacuum cleaners, washers, ironers, ranges, dishwashers, air heaters, and a 24-gal. electric water heater—the dishwasher and water heater being connected with the sewer so they can be operated properly.

The display of price cards, both in windows and store, is necessary as it is found in the electrical business that the public often thinks that electrical goods are high-priced. They are agreeably surprised to find that such a beautiful percolator, toaster, grill, etc., can be purchased for so low a price! The popular fallacy regarding the high prices of electrical merchandise has too long existed and must be broken down. One of the best ways to overcome this idea is by the liberal display of price information. Price cards should be neat and attractive and preferably of a distinctive design. This price card in itself offers a splendid opportunity for the advertising of electrical merchandise and appliances and other devices may be advertised at seasonal times.

During the daytime a well arranged store with attractively dressed windows will draw the attention of passers-by but at night some other means of attracting attention must be employed. No better way of advertising the location of a store can be found than the electric sign. Every electrical dealer should have such a sign and should furthermore keep it lighted during the hours of evening traffic. It is especially important that electrical stores should have electric signs not only for the advertising value of the signs themselves, but for the effect on merchants in other lines of business. A shoe dealer, for example, can hardly be expected to have confidence in electric signs if the local electrical dealer does not himself use one. This store uses two electric signs, one over the sidewalk and one on the front of the building. They are both as wide and long and high as the law allows. In addition, on each window the firm name is painted in gold, and then again, it is cut in the marble entrance. This store is proud of its name and presents it boldly to the world. Every dealer should do the same—electrically. Electric signs have too often proved their worth to require comment as to their value. No other single means has been found so effective in drawing people to a store at night as an attractive sign, whether it be merely a name sign or one with characters, figures or symbols. Moving or flashing signs are, of course, of much greater value than still signs but any attractive illuminated sign will earn its cost many times over.

The Position of the Jobber in the Distribution System

By E. A. Kincaid

Associate Professor of Commerce, McIntyre School of Commerce, University of Virginia

FOR the purpose of this discussion the term jobber will be used as synonymous with wholesaler. Such is not always the use of the term, for in some industries there are jobbers who stand between the wholesaler and the dealer, but this is not the case in the electrical field on the Pacific Coast. The electrical jobber is a recent addition to the jobbing profession, but he has the traditions and practices of an old and honorable business to fall back upon, for wholesaling came into existence with the rise of the factory system about 1760.

Distribution through jobbers requires a volume of business of such proportions that the manufacturer must find his market over a wide area. Under such conditions it becomes necessary to find a large number of retail outlets, and for this purpose the jobber functions more effectively than most manufacturers. Thus it appears that the jobber came into being as the result of the same economic forces that brought about specialized production for a constantly increasing market. In other words, jobbers exist because, taken as a whole, they perform an important and indispensable economic function. There are jobbers and jobbers, but taken in the aggregate they are a distinct part of our marketing system, not as the result of mere chance or accident, but solely because they meet an economic need and do it well.

The economic importance of the electrical jobber is not in the least open to question for there are (1921) upwards of 1,333 electrical manufacturing establishments with an output valued at \$883,985,000. Moreover, these establishments are largely centered in five states, 73 per cent of the production (in value) coming from the states of Illinois, New York, Pennsylvania, Ohio and New Jersey. The concentration of the industry in these states goes far toward explaining the necessity for jobbers. Few manufacturers are powerful enough to cover the markets of the entire country and without the aid of wholesale distributors the problem of reaching the market in such distant regions as the Pacific Coast would be difficult in the extreme. It is true that manufacturers of some lines both in and out of the electrical field are reaching the market over the head of the jobber. It is also true that jobber distribution has come in for much critical discussion. But the fact is that electrical jobbers are as firmly established as those in most other lines and confronted with problems that are only a little more serious than those

WHY does the jobber occupy such an important place in the distribution of electrical products on the Pacific Coast? What are his responsibilities to his principals and his customers? Is he functioning as he should? These are some of the questions which Mr. Kincaid answers in this important and interesting article in his series.

faced by jobbers in other fields at some time or other in their history.

The jobber has been defined as a merchant who buys goods in large quantities and wide variety from manufacturers and sells them to his customers, usually retailers. With respect to the electrical industry, this definition requires a good deal of amplification.

In the first place, there are several varieties of jobbers to be found in the electrical industry as it is developed in Pacific Coast territory. (1) There is the large jobber operating in Coast cities with branch offices in outlying places. (2) There is also the large jobber with branch offices and equipment to give engineering service. (3) Then we have the small jobber with an organization of no more than local influence in Coast cities, and (4) large jobbers located in inland cities. (5) Small jobbers operating in inland cities, and (6) retailer jobbers who are trying to grow out of the retailing business into the jobbing business must be differentiated from the others. (7) There are also western branch houses functioning as jobber outlets for eastern manufacturers, and (8) hardware jobbers with electrical departments.

This classification is based mainly upon power in distribution and when the importance of this matter is considered the distinctions are not unduly labored. While a jobber is a jobber, there is a vast difference in their power to cover the market which may be regarded as falling within a jobber's territory. There are always two questions for the manufacturer to consider: (1) What territory does the jobber cover and (2) how well does he cover it? The jobber offers the manufacturer an outlet to a given market. Just what the market may amount to is, to a large extent, determined by the nature of the outlet, its financial strength and the intensity with which it covers the field. When the work of the jobber is considered from this angle the foregoing classification has meaning.

Jobbers may also be classified with respect to control or ownership. There are jobbing corporations the capital stock of which is owned by manufacturing establishments. There are electrical jobbing concerns which are independent of such control. Again, there are electrical jobbers who are nominally independent of any electrical manufacturing concern, but actually far from independent because of credit relations with manufacturers. In the next place,

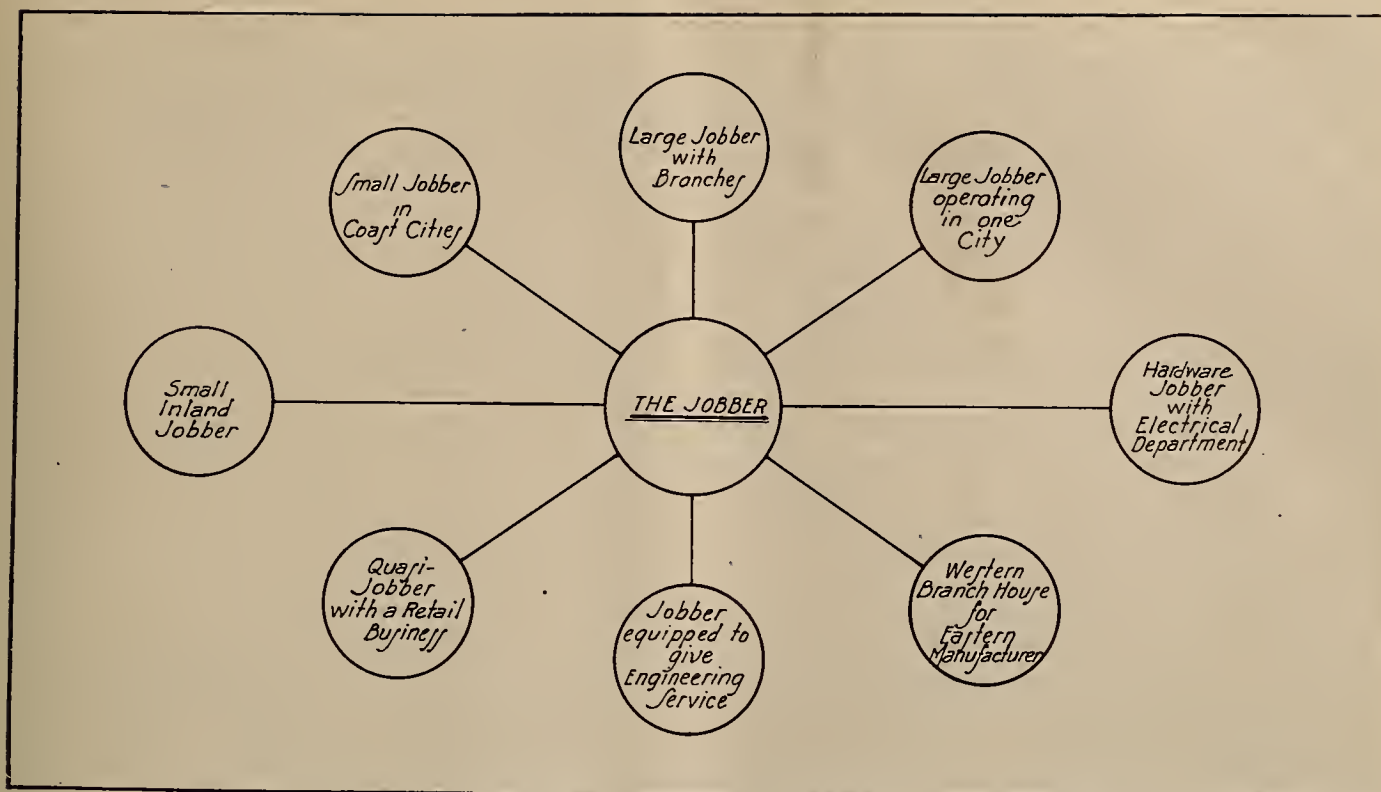


Chart showing the various classes of jobbers operating in Pacific Coast cities.

jobbers may be classified on the basis of their relations with each other. Thus we find jobbers affiliated into associations or trade organizations and these are known in trade circles as "association" jobbers, while those who do not affiliate with such an organization are known as "non-association jobbers."

Finally, there is a classification of jobbers that is too often overlooked, namely, that based upon merchandising methods. There are jobbers who look upon the jobbing business with a view that is now somewhat antiquated and narrow, while over against these one meets with jobbers who perform all the functions traditionally inherent in the business and in addition service the goods that they distribute. These latter jobbers are experts in sales promotion and in the education of dealers. They do not wait for the business to come to them, they go after the business by teaching their dealers how to expand sales. It is just a case of performing all the old jobber functions plus the much needed service of improving the dealer outlets within the jobber's control.

The several classifications here considered are important. They may be looked upon as so many tests which a manufacturer may apply to a given jobber. When so applied the jobber's position becomes quite definite and most of the guesswork is eliminated. Thus, a given jobber is identified as weak or strong in distribution, independent or controlled. If controlled it may be by means of credit extended or it may be by means of ownership of capital stock. He is either regular or otherwise, progressive in his merchandising methods or backward. When a manufacturer knows these things he is in a fair way to know what kind of an outlet a given jobber will afford.

The Jobber's Outlets

From the point of view of the manufacturer the jobber's business may be looked upon as a sort of intermediary reservoir with a large number of faucets. So far as electric appliances, fixtures, radio apparatus and some other goods are concerned the faucets are retailers of one sort or another. For certain other lines that the jobber handles the outlets are industrial corporations and central stations. The main point here to be stressed is this, the greater the number of effective outlets the more useful the jobber is to the manufacturer.

Thus it appears that the jobber occupies a very important position in the mechanism of distribution. He faces two ways at once, for he has relations very definite and very intimate with the manufacturer and his relations with retail outlets and consumers are of no less importance. From each side he is looked to for certain very definite services and from each he receives criticism or praise according as he fulfills expectations. Of these two relationships it is difficult to make a distinction as to relative importance. From the point of view of one who thinks over these problems with a detached interest the jobber's relations with the manufacturer appear to be most critical and delicate. In a sense the jobber is a manufacturers' agent operating in the immediate contact with dealers. The more powerful the manufacturing corporations become the greater the temptation to absorb the jobber's function. From this it follows that the jobber's chief hope is in the small manufacturer whose prospects of an independent distributive system are remote. Since we are living in a dynamic social order the chance of reaching an era where no small manufacturers will exist is remote. Thus it follows that the jobber is in the

distributive business to stay, but to stay only so long as he serves small manufacturers with sufficient efficiency to enable them to survive.

Now on the other hand, the jobber's relations with his outlets are no less vital. These outlets are the outposts of the distributive system. They must function if the public is to be served. If the conditions within the trade are such that profits in retailing do not draw men who can and do make these outlets function, then the jobber's position is imperiled, for, virtually, he has nothing to offer the manufacturer. There is also the further complication that enterprising and powerful manufacturers do not regard it as in any sense improper to scrutinize the dealer situation for the purpose of bolstering it or in other ways forming a more intimate contact. Any such disposition on the part of the manufacturer is something of a menace to the jobber. What he should seek is more intimate relations with the manufacturer and a situation such that there will be less need for closer relations between manufacturers and dealers. The more alert and active jobbers fully sense this situation and they are seeking so to function that the manufacturer will have no occasion to do more than satisfy himself as to his jobber, then leave the rest to him. There can be no question but that the jobber's responsibilities for his outlets are just as great as his responsibilities to his outlets, and the measure of this responsibility is just as vital as the jobber's hope of survival, neither more nor less.

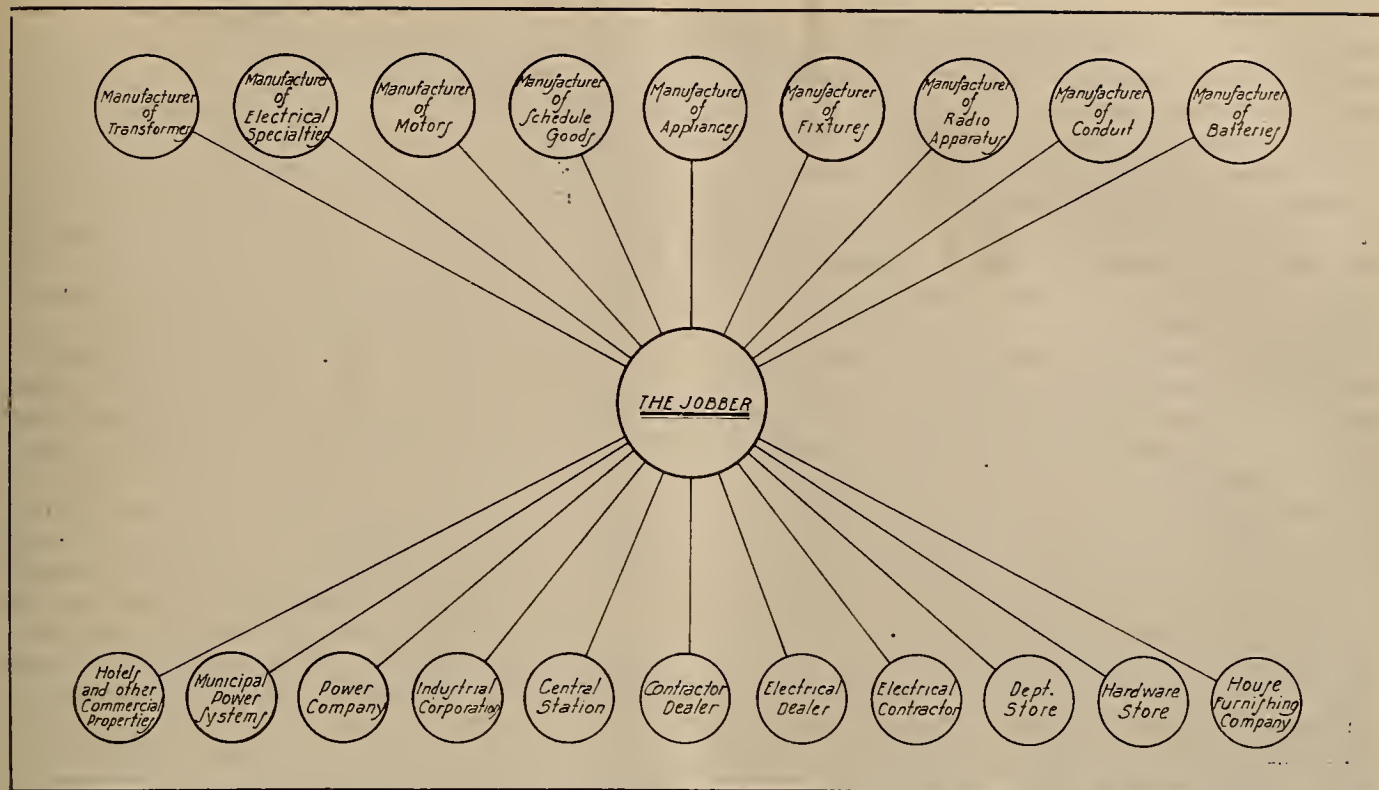
In the hardware field there is a situation which an electrical manufacturer may look upon as comparatively ideal. There is a well developed and thoroughly established hardware industry marketing its output through jobbers who stand for the very best things in the jobbing profession. These jobbers, however, owe their strength to a large extent to the fact that the retail outlets for hardware are now standardized and functioning. When the consumer thinks of hardware he thinks of the hardware store. Every community has one or more of them and most everyone in the community knows what can be purchased there. Now it will not do to intimate that hardware distribution has no problems. That is not the point. The hardware industry has its problems but they are nothing like as severe as those in the electrical field for the reason that consumers have not been taught to think of the electrical dealer when they think of electrical goods. This is so because there are numerous factors at work which tend to make the consumer think of some other sort of dealer. All of this will come in for fuller treatment later, but before the point is passed, let me say that one of the things essential to the future of the electrical jobber and the electrical dealer is that the consumer be taught to think of a definite place where he can with certainty find the electrical goods that he wants when he thinks in terms electrical. That is why the jobber has a vast responsibility for the future of the outlets which he holds forth as an inducement to the manufacturer.

The Hardware Store

It may be said that the hardware store is much

older. That is true, and in consequence it has had a longer time in which to intrench itself in the regard of the consumer of hardware. However, the emphasis must be placed on the shaping of the consumer's buying habits. They are being shaped with certainty from day to day with respect to electrical goods. What is the jobber doing about this? Is it not certain that on this matter hangs the future of the jobber more than any other? The local hardware store is, relatively speaking, time-tried and tested, thoroughly intrenched and a social institution that fits snugly into the economic life of the community. There results from this a dependability as to jobbers' outlets that puts the hardware jobbing business on a very different basis from the electrical jobbing business. The electrical counterpart of the hardware dealer is the contractor-dealer. But he offers no such outlet to the electrical jobber as the hardware dealer does to the hardware jobber. It is because of this fact that there is instability in the electrical jobbing field. It is because of this that electrical appliances and some other lines are going to the consumer by other routes. And just here we enter upon the important question of the relation of the jobber to the other outlets that are developing. This cannot be taken up fully here, but it overlaps this present question, the jobber's outlets. The fact is that the jobber is in danger of losing control of the economic forces that determine his future in so far as new outlets develop which are more or less certain to be just outside his reach. There is the hardware store with its tendency to carry certain electrical products which might very well be thought of by the consumer when he thinks of other goods ordinarily found in a hardware store. There is the department store with its electrical department at hand because the housewife must have service. If she thinks of egg-beaters, the electrical egg-beaters must be exhibited along with other sorts if the service is what it ought to be. There is the house furnishing concern whose customer may be made to think of an electric cleaner when considering the purchase of carpets. These are outlets which the jobber is now tapping to some extent and they are compelling his attention. Why? It is just a case of the association of ideas. Cannot the jobber take advantage of this fact to standardize the retail outlet for electrical goods so that the consumer will think of the electric shop when certain wants come to mind? This question is at the center of the problem of the relation of the jobber with his outlets and these outlets are the most important thing that he has to offer the manufacturer.

It is true that some jobbers look upon the growing volume of sales made through department stores and other like outlets with complacency. Perhaps this attitude is justified, but there is this to be said: the greater the number of outlets with essentially different merchandising systems, the greater the problem of the jobber in so far as he looks to these outlets for business. The jobbing system must find its best development in a soil where its roots will take a firm and lasting hold. The jobber has the surest footing when dealing with a retail merchan-



The position of the jobber in the distribution system, that of intermediary between a group of manufacturers and various classes of retailers and consumers.

dising unit that he understands. It is for this reason that many jobbers view with apprehension the development of retail outlets other than the contractor-dealer. Moreover, how can the jobber be at all certain that department stores will not buy from the electrical manufacturer just as they often buy from other manufacturers, rather than from the electrical jobber of the same community?

The Functions of the Jobber

It has been made clear that the jobber stands at a strategic place in the distributive system, facing as he does in two ways—toward the manufacturer on the one hand and toward the several available retail and other outlets for electrical goods on the other. He is in this position because of the economic functions which he performs with respect to each group. We may now take time to consider what functions a typical or representative jobber performs. Perhaps the reader will say that these functions are well known. Even so, it will make for clarity if they are here presented and considered with respect to the distribution of electrical goods in particular.

The representative jobber (a) has a jobbing territory which he more or less effectually serves. Its boundaries are determined by the railroad freight-rate structure of the territory where he operates, by the aggressiveness of his competitors, by the efficiency and strength of his own sales force, by the character of the goods which he handles, by the distribution of centers of population which may be reached from a given jobbing center, by the amount of capital at his command and the number of branches which he may be able to operate.

(b) The jobber is an expert in marketing and merchandising within the limits of the line that he

undertakes to distribute. Perhaps this is saying too much. Nevertheless it is true, relatively speaking, for he ordinarily knows much more about the problems of distribution within his own territory than the manufacturers for whom he distributes. To say that he is an expert in merchandising is going rather far for the typical or representative jobber, for the problems of merchandising, when done along the most approved modern lines, are far from simple. While a comparatively few jobbers are merchandising their lines according to the most advanced knowledge of the subject, it is true that the typical jobber is fairly familiar with the buying power of his territory, that he is well informed as to the number and strength of his competitors, that he keeps a reasonably close check upon the activities of industrial and other corporations that may be in the market for his goods, that he knows a good deal about the ramifications of the numerous corporations and concerns which may be said to give his territory its economic characteristics, that he has some information as to the sources of wealth within his territory and in general he is familiar with all the factors that determine the state of the market for electrical goods within his territory from time to time. Necessarily he knows a good deal about credit conditions and the number and strength of retail outlets for goods.

Upon this background or foundation the jobber undertakes to assemble goods well in advance of the demand. In performing this function he buys electrical products from scores of manufacturers in widely scattered sections of the country and thereby places at the disposal of dealers thousands of items. These are assembled in the jobber's warehouse and held as a reserve stock for the future needs of the

territory where he operates. From this reservoir there is a constant flow and, hence, there is the necessity of a constant refilling of the warehouse. Just how intelligently this is done is one of the determining factors in fixing the profits of the jobber.

Because of this service the manufacturer may be spared the problem of studying consumer demand and all the mistakes that might very well be made in producing with respect to quantity, standards and quality. But the jobber does much more, for he makes it possible for the manufacturer to make a relatively few large shipments to the jobber's warehouse rather than many small shipments directly to dealers. This means a great saving in handling and freight charges to every consumer of electrical goods. Furthermore, the jobber makes it unnecessary for the manufacturer to maintain a branch house with an accumulation of goods. By making use of the jobber the manufacturer really enters into a cooperative relationship with other manufacturers whereby the costs of distribution are reduced to all. Few manufacturers have a sufficiently varied line to justify a branch house on the Pacific Coast, for the narrower the manufacturer's line of products the heavier the fixed charges per unit of sales. Distribution through jobbers means a distribution of overhead on the basis of sales made for each manufacturer.

The jobber performs an important financial service to manufacturers by extending credit to dealers. If the manufacturer sold directly to dealers he would have, instead of one account with a jobber, hundreds of accounts with dealers about which he must, of necessity, know less than the jobber does. Consider the expense that the manufacturer who sells over the head of the jobber must incur in looking up the credit standing of the multitude of dealers from whom orders must come. But even if the manufacturer could solve this problem, he would find it almost impossible to place goods in the hands of dealers and other buyers just when they are needed. This is particularly applicable to Pacific Coast territory, the jobbing centers of which are so far removed from factories, because of the uncertainty as to arrival of shipments.

The jobber's salesmen must not be overlooked, for they place before the dealer a catalog containing a vast array of electrical products from which the dealer may make his selection. On the other hand, the manufacturer's salesmen have a comparatively narrow line, being confined to the goods manufactured by one concern. The jobber's salesmen are the jobber's eyes. They not only sell, they study conditions in every community and report upon their observations. Many of these data will come to the attention of the jobber's credit man. He is in far closer touch with the retail outlets for goods than the credit department of the manufacturer can be. Thus it follows that the jobber may safely make sales that no manufacturer could consider. The more intimate knowledge of credit conditions on the part of the jobber makes his risks less and a greater volume of sales is made because of this than would otherwise be possible.

The jobber has on hand and within easy reach of

dealers and other buyers a stock of goods which may be tapped as required. But for this the dealer would have to receive salesmen from numerous manufacturers and attend to all the correspondence that might arise with each one. This is a combination of duties far too heavy for the ordinary dealer. If the dealer handles the products of only a few manufacturers, as in the case of shoe stores or an automobile agency, this problem would be fairly simple. But the case is very different with the contractor-dealer, the electrical dealer or the department store.

In the next place, the manufacturer prefers to sell in large quantities while the dealer prefers to buy in small quantities. At any rate the dealer who knows his business will hesitate to buy in large quantities. Moreover, many manufacturers will not sell directly to retail outlets and for this reason certain products can be had only from the jobber. Large shipments can be handled at lower costs than small ones. Freight rates encourage large shipments and the nearer the goods can be moved, in large units, to the ultimate consumer, the lower the cost of doing business. Thus the jobber, by bringing goods in large-unit shipments close to dealers, reduces the costs and lowers the prices to dealers. The jobber's function of buying in quantities and breaking up these purchases for redistribution to dealers is of great social importance as well as service to dealers.

The jobber may by extending credit make it possible for a man with small capital to open a retail business and thus provide one more outlet for goods. While this service on the part of the jobber may mean a larger service to the community, it may also mean the establishment of retail outlets that lack all the characteristics of independent operation. But jobbers have a knowledge of regional and local trade conditions which they may place at the disposal of the dealer and thus make his chances of survival more promising than they would otherwise be. Finally, if the dealer does not buy from the jobber, he will require more storage space, a large initial investment and more working capital than would otherwise be the case. He would find it necessary to buy in larger quantities and to carry stock for longer periods. His risks arising from changes in business conditions would be multiplied accordingly.

With this brief statement of the services of the jobber to the manufacturer on the one hand and to the dealer on the other it is possible to pass to a consideration of the actual position of the jobber in the trade. What has just been said with respect to the jobber's functions applies to the typical jobber. Most jobbers perform these several services. Some jobbers perform them with great efficiency. To the extent that they are well performed the jobber's position is strengthened. The chief purpose in outlining these functions here is to make it clear that any jobber has a status that results from definite relationships which are the outgrowth of economic conditions. These relationships are economic ties which may be strengthened or weakened as time goes on. Any correct understanding of actual conditions, which jobbers confront from day to day must rest on this foundation.

Practical Public Relations

By O. L. Mackell*

Office Manager, Public Service Company of Colorado, Denver

PUBLIC attitude today has become of major importance in all lines of business depending on the patronage of the public. Nowhere is it of more concern or value than to the utility providing some form of service, whether in rural districts or metropolitan centers. There are two distinct phases to this subject—one has to do with the principle of government-operated utilities versus private ownership, while the other phase concerns the sale of some specific service such as transportation, communication, light, heat or power.

It is this last phase which I shall presume to present for your consideration, from the specialized angle of the office or "book" end of one of the largest utilities in the Rocky Mountain region.

The oft-charged "public be damned" policy of a decade ago died a useful death when it opened up a way for a closer human influence between the public and the utility.

For the purposes of this paper consideration is given only to the public, the individuals of which may or may not be customers, for the reason that the public relations subject to be given thorough consideration must also include the appeal to the employee and the stockholder.

In our company, when an applicant applies for service, the contract department scrupulously and carefully tells when service may reasonably be expected in order that there will be no initial disappointment on the part of the customer. Employees are instructed to advise them that if the service or equipment provided by the company is not satisfactory to call the company any time of the day or night.

If the call is made in person it is presented at the investigation department, while if made by telephone the employee answers "service department." Men are used at the counter while pleasant-voiced girls answer the phones and they are expected to learn the exact trouble of the customer. If a gas leak is reported, immediate attention is ordered through a direct telephone branch with the gas-service department. If difficulties with the electric lights are reported in the daytime, arrangements are made to see that the condition is corrected before dusk.

Even more attention is given to insure service after dark. When a trouble man is sent out on a call he is instructed to telephone the office after making that call, or the last of a series of calls, to learn if there is any additional work in the neighborhood. Either the last customer's phone or that of a nearby fire house or police station is utilized for this purpose.

It frequently happens that when a customer reports his difficulty, within two or three minutes a service man is at his door. The former thinks this an uncanny arrangement because he may have just hung up the receiver. I can tell you that next to

the pocketbook there is nothing that appeals more strongly to the customer than this almost instantaneous service. It will make him think and appreciate the company's effort to serve when nothing else will.

The telephone plays a major part in our ability to serve our customers promptly and adequately. With each yearly increase of customers, added telephone facilities are required both in the number of branches as well as in trunk lines, so that the customer can communicate with the company and the right department at any time with a minimum delay.

The inflection and tone of the operator's voice answering "Public Service Company" and the manner in which she handles the call is an all-important feature in our relations with the public. Any time when necessary the operator will take service calls. Whenever a customer, thinking his trouble or difficulty demands the attention of the higher-up, asks for the president, the operator politely informs the inquirer that "the president is out of town (which is true)—but I'll give you the office manager." This system results in the call being connected with his desk, thus saving the time of the general manager with what is generally found to be petty complaints. But if the party asks for the general manager by name, regardless of the nature of the call, he gets to talk to him promptly.

With all complaints, the company goes the limit. Nothing is left undone in order to satisfy the customer. Regardless of the difficulties or the impossibility of solution, employees are instructed under no circumstances to say, "Sorry, we can't do anything for you."

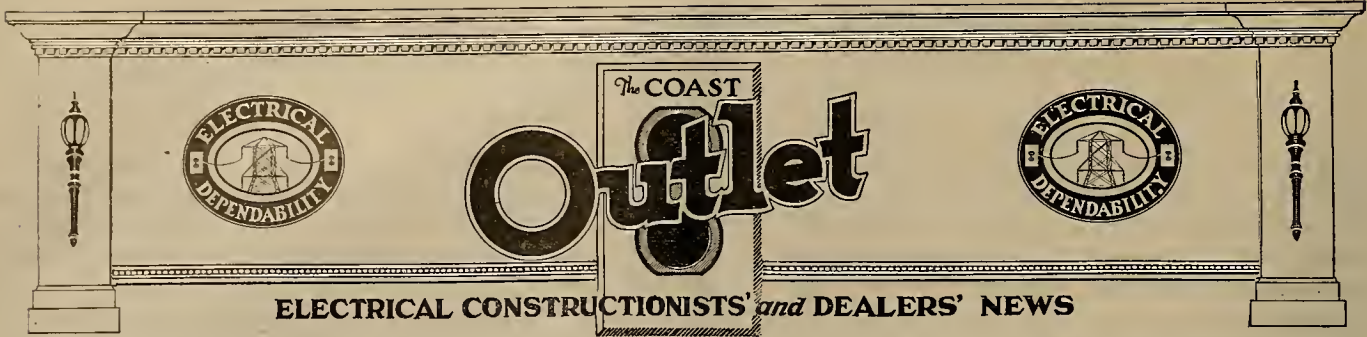
Cases are even encountered in our company when customers complain of high bills. Even if there is no immediate solution or settlement possible and with the discount period ready to expire, if that customer asks, "Do I have to pay my bill today?" the instant reply is, "No, a day or so will be all right in order that we can look into the matter."

What we believe to be a good investment is that of a uniformed floor officer. His primary object is to keep an eye on the cashier's cages and to serve as an escort to and from the banks. Otherwise he is found to be of considerable help in serving the customers who come into the office or salesroom by answering inquiries, and in preventing jams at either the cashier's cages or contract counters.

It is not alone a matter of his seeing that people are served properly and promptly, or "taken care of all right," but to see that they go out feeling all right.

A satisfied customer is our paramount object. The employee must take this to heart. Even if proficient in one particular department, it is our practice to provide schooling for them in all departments, the primary reason being for use in emergencies—the entire objective being better service to the public.

*Extracts from a paper before the Midwinter Meeting of the Rocky Mountain Division, N.E.L.A., Denver, Dec. 18, 1923.



Electrical Construction

By E. Earl Browne

THE determination of the proper fuse, wire, conduit and switch sizes to use in motor installations to give proper protection, with a minimum of expense, is not as simple as first thought might indicate. In the first place, any single phase repulsion, repulsion-induction or squirrel cage polyphase motor starting with an "across the line" type of starter requires from 250 to 600 per cent of full-load current as a starting current, and if the 1920 National Electrical Code Rule 8-c (pages 18 and 19 under "Size and Protection of Conductors of Motor Circuits") and Rule 808 (pages 66, 67 and 68 of the 1923 Code under "Protection of Motor Circuits") are strictly adhered to, the sizes of wires to be provided to meet their requirements seem, for the short starting period of a few seconds, to be too large.

It is with this thought in mind that some inspection departments and bureaus have compiled tables which permit the use of smaller sizes than the above-mentioned rules contemplate. A most valuable set of tables was compiled by the Industrial Accident Commission of the State of California and has been issued in its Electrical Safety Orders (Proposed Revised Form, pages 226 to 240, inclusive). Tables 1, 2, 3 and 4 shown are the most commonly used by the electrical contractor.

These tables and rules are complete, so far as sizes of circuit wires, etc., are concerned, but the question of

TABLE 1.
Single-Phase, 110 Volt, Repulsion-Induction Motors with Compensating Windings.
Continuous Duty.

Rated horsepower	*Syn. speed	Wire and conduit sizes						§Circuit overload protection	†Motor running overload protection	
		Approx. full load current	To running over- load protection		From running overload protection to motor					
			Rubber or varnished cloth insulation		Rubber insulation		Varnished cloth insulation			
			†Wire	Conduit	Wire	Conduit	Wire			Conduit
1/4	1800	4	14	1 1/2					15	
1/4	1200	5.8	14	1 1/2					20	
1/2	1800	6.4	14	1 1/2					20	
1/2	1200	7.4	14	1 1/2					20	
3/4	1800	8.6	14	1 1/2					25	
3/4	1200	10.6	12	1 1/2					30	
1	1800	11	12	1 1/2					30	
1	1200	13.6	10	3/4					35	
1 1/2	1800	15	10	3/4					35	
2	1800	20.6	8	3/4					45	
2	1200	23.4	8	3/4					45	
3	1800	28.4	6	1	8	3/4			55	35
3	1200	31	6	1	6	1			60	40
5	1800	46	4	1 1/4	4	1 1/4	6	1	90	60
5	1200	48	4	1 1/4	4	1 1/4	6	1	100	60
7 1/2	1800	66	2	1 1/4	3	1 1/4	4	1 1/4	125	80
7 1/2	1200	76	1	1 1/4	2	1 1/4	3	1 1/4	150	90

*Speeds given are for 60 cycles. Table applies to 50-cycle motors with corresponding speeds of 1500 and 1000 r.p.m.
†Wire sizes given in this column apply to entire branch circuit when motor is rated at 2 h.p. or less. Wire with varnished cloth insulation can not be used in sizes smaller than No. 6 without special permission.
‡Running overload protection not required with motors rated at 2 h.p. or less, but recommended with all continuous duty motors larger than 1/2 h.p.
§Assumed that no starting rheostat will be used.

TABLE 2.
Single-Phase, 220 Volt, Repulsion-Induction Motors with Compensating Windings.
Continuous Duty.

Rated horsepower	*Syn. speed	Approx. full load current	Wire and conduit sizes						§Circuit overload protection	†Motor running overload protection
			To running overload protection		From running overload protection to motor					
			Rubber or varnished cloth insulation		Rubber insulation		Varnished cloth insulation			
			†Wire	Conduit	Wire	Conduit	Wire	Conduit		
1/4	1800	2	14	1 1/2					10	
1/4	1200	2.9	14	1 1/2					10	
1/2	1800	3.2	14	1 1/2					10	
1/2	1200	3.7	14	1 1/2					15	
3/4	1800	4.3	14	1 1/2					15	
3/4	1200	5.3	14	1 1/2					15	
1	1800	5.5	14	1 1/2					20	
1	1200	6.8	14	1 1/2					20	
1 1/2	1800	7.5	14	1 1/2					20	
2	1800	10.3	12	1 1/2					30	
2	1200	11.7	12	1 1/2					30	
3	1800	14.2	10	3/4	12	1 1/2			35	20
3	1200	15.5	10	3/4	12	1 1/2			35	20
5	1800	23	8	3/4	8	3/4			45	30
5	1200	24	8	3/4	8	3/4			45	30
7 1/2	1800	33	6	1	6	1			65	40
7 1/2	1200	38	4	1 1/4	6	1	6	1	75	50
10	1800	45	4	1 1/4	4	1 1/4	6	1	90	55
10	1200	47	4	1 1/4	4	1 1/4	6	1	90	60

*Speeds given are for 60 cycles. Table applies to 50-cycle motors with corresponding speeds of 1500 and 1000 r.p.m.
†Wire sizes given in this column apply to entire branch circuit when motor is rated at 2 h.p. or less. Wire with varnished cloth insulation can not be used in sizes smaller than No. 6 without special permission.
‡Running overload protection not required with motors rated at 2 h.p. or less, but recommended with all continuous duty motors larger than 1/2 h.p.
§Assumed that no starting rheostat will be used.

sizes of services, feeders and sub-feeders for a group of motors is one which the contractor or inspection department is usually obliged to figure on a 100 per cent demand factor. He must also provide for sufficient capacity for the starting of the largest motor with all other motors operating at full load.

With this in mind, and in the absence of a guaranteed demand factor by the owner, it is usually safe to apply the following rule: Add together the full-load currents of all motors supplied by the service, feeder or sub-feeder under consideration, and add thereto 50 per cent of the starting current of the largest motor. The following are examples to illustrate the rule:

Example No. 1

220-volt, 3-phase installation:

	Amps.	Amps.
3— 1 hp. = 3x 3.0 = 9.0		
2— 3 " = 2x 9.0 = 18.0		
4— 5 " = 4x14.0 = 56.0		
1— 7½ " = 1x20.0 = 20.0		
1—15 " = 1x38.0 = 38.0		
1—30 " = 1x75.0 = 75.0		

Total full-load current = 216.0

50 per cent of starting current of largest motor = 75 amps.
x 200% x 50% = 75.0

Total load to be provided for = 291.0

Referring to Table "A" (page 44) and Table No. 1 (page 76), of the National Electrical Code, three 350,000 C.M. R.C. cables would be used in a 3-in. conduit and a 400-amp., 3-pole, 250-volt safety switch with 300-amp., 250-volt cartridge fuses.

Example No. 2

440-volt, 3-phase installation:

2— 10 hp. = 2x 13.0 amps. = 26.0 amps.	
2— 25 " = 2x 32.0 " = 64.0 "	
1— 50 " = 1x 62.0 " = 62.0 "	
1— 75 " = 1x 91.0 " = 91.0 "	
2—100 " = 2x 123.0 " = 246.0 "	

Total full-load current = 489.0 "

50 per cent of starting current of largest motor = 123 amps. x 200% x 50% = 61.5 "

Total load to be provided for = 550.5 "

Result: Three 800,000 C.M. R.C. cables in a 4-in. conduit and a 600-amp., 500-volt a.c., 3-pole safety switch with 550-amp., 600-volt cartridge fuses.

TABLE 4.
3-Phase, 440 Volt, Squirrel Cage Induction Motors. Continuous Duty.

Rated horsepower	Approx. full load current	Wire and conduit sizes						Circuit overload protection	† Motor running overload protection
		To running overload protection		From running overload protection to motor					
				Rubber or varnished cloth insulation		Rubber insulation				Varnished cloth insulation
		*Wire	Conduit	Wire	Conduit	Wire	Conduit		
1/4	.5	14	1 1/2					5	
1/2	1	14	1 1/2					5	
3/4	1.3	14	1 1/2					8	
1	1.6	14	1 1/2					10	
1 1/2	2.3	14	1 1/2					12	
2	3	14	1 1/2					15	
3	4.6	14	1 1/2	14	1 1/2			20	6
5	7	14	1 1/2	14	1 1/2			25	10
7 1/2	10	12	3/4	14	1 1/2			30	12
10	13	10	3/4	12	3/4			35	20
15	19	8	1	10	3/4			50	25
20	26	6	1 1/4	8	1			65	35
25	32	6	1 1/4	6 1/2	1 1/4			75	40
30	38	6	1 1/4	6	1 1/4	6	1 1/4	90	50
35	44	4	1 1/4	4	1 1/4	6	1 1/4	100	55
40	51	4	1 1/4	4	1 1/4	4	1 1/4	120	65
50	62	3	1 1/4	3	1 1/4	4	1 1/4	130	80
60	73	1	1 1/2	2	1 1/2	3	1 1/4	150	90
75	91	0	2	0	2	2	1 1/2	200	110
100	123	000	2	00	2	0	2	250	150
125	156	0000	2 1/2	0000	2 1/2	000	2	325	200
150	184	250,000	3 1/2	0000	2 1/2	0000	2 1/2	375	225
200	246	350,000	3	350,000	3	250,000	2 1/2	500	300
250	310	500,000	3	500,000	3	400,000	3	600	400

*Wire sizes given in this column apply to entire branch circuit when motor is rated at 2 h.p. or less. Wire with varnished cloth insulation can not be used in sizes smaller than No. 6 without special permission.

†Running overload protection not required with motors rated at 2 h.p. or less but recommended with all continuous duty motors larger than 1/2 h.p.

TABLE 3.
3-Phase, 220 Volt, Squirrel Cage Induction Motors. Continuous Duty.

Rated horsepower	Approx. full load	Wire and conduit sizes						Circuit overload protection	Motor running overload protection
		To running overload protection		From running overload protection to motor					
		Rubber or varnished cloth insulation		Rubber insulation		Varnished cloth insulation			
		*Wire	Conduit	Wire	Conduit	Wire	Conduit		
1/4	1	14	1 1/2					10	
1/2	2	14	1 1/2					10	
3/4	2.5	14	1 1/2					12	
1	3	14	1 1/2					15	
1 1/2	4.5	14	1 1/2					20	
2	6	14	1 1/2					25	
3	9	12	3/4	14	1 1/2			30	12
5	14	10	3/4	12	3/4			40	20
7 1/2	20	8	1	10	3/4			50	25
10	26	6	1 1/4	8	1			65	35
15	38	6	1 1/4	6	1 1/4	6	1 1/4	90	50
20	51	4	1 1/4	4	1 1/4	4	1 1/4	120	65
25	63	3	1 1/4	3	1 1/4	4	1 1/4	130	80
30	75	1	1 1/2	1	1 1/2	2	1 1/2	150	100
35	88	0	2	0	2	2	1 1/2	180	110
40	101	0	2	0	2	1	1 1/2	200	125
50	123	000	2	00	2	0	2	250	150
60	146	0000	2 1/2	000	2	00	2	300	180
75	182	250,000	2 1/2	0000	2 1/2	0000	2 1/2	375	225
100	245	350,000	3	350,000	3	250,000	2 1/2	500	300

*Wire sizes given in this column apply to entire branch circuit when motor is rated at 2 h.p. or less. Wire with varnished cloth insulation can not be used in sizes smaller than No. 6 without special permission.

†Running overload protection not required with motors rated at 2 h.p. or less but recommended with all continuous duty motors larger than 1/2 h.p.

This work and these conditions must always be considered in complete harmony with the local inspection departments. It may at times seem that local requirements are too exacting but the regulations of local bureaus are usually based on experience with conditions as found locally and rulings are made with the view of providing safety and not ordinarily merely for arbitrary reasons. Inasmuch as the promotion of the use of electricity and electrical devices depends to a great extent upon the safety appeal of such equipment every means should be employed to increase the safety factor. Contractors and workmen who are sincere in their efforts will always take steps to see that installations are in accordance with all requirements and that capacities and protection are in every case adequate for the maximum demand and use, thereby increasing the satisfaction derived and promoting the further use of electrical equipment.

Proper Insulation Aids Sale of Heating Equipment

Heat Losses Often Exceed Necessary Operating Expense and Retard Installation and Sale of These Devices

By KENNETH H. DYER
Western Insulux Company

The advantages and applications of modern insulating materials and methods are unfortunately little realized by the average home owner or builder. It is not unusual to find a hot water boiler neatly covered with one layer of asbestos paper and the owner imagining the fuel saved by its use. One layer of asbestos paper actually increases radia-

with constructional problems in mind and with cooperation from the architect and builder, the owner will be saved additional labor charges.

The losses resulting from the use of an uncovered range and boiler pipes in even a small house are surprising. Take, for example, the modern automatic electric hot water heater with an uninsulated system. It has been proven that more energy is lost in the dissipation of heat from the uncovered surfaces than is actually needed for heating the water. This means that if the electric bill for a certain period was, for example, \$10, the owner would be paying about \$4.50 for hot water heating and \$5.50 because someone did not urge him to insulate. This \$5.50 contribution is not wanted by the power company and fortunately for the owner, it does not take very many of these donations to thoroughly insulate every pipe and boiler in the house.

The following figures are compiled from tests of competent engineers and serve to give a more complete idea of the heat losses resulting from the use of uncovered pipe lines and boilers. It is assumed that a 30-gal. boiler and 100 ft. of 1½-in. pipe are typical of the average domestic system; that the room temperature averages 65 deg. F., and that the water is to be kept at an average temperature of 160 deg. The radiation losses for one month's continuous operation will be 442 kw-hr. which, at a 2c. rate, amounts to \$8.84. Now, considering the same conditions with the addition of complete insulation, the radiation losses will be reduced fully 90 per cent. This means a saving of \$7.95; certainly enough to be considered, particularly as this loss will accrue continuously.

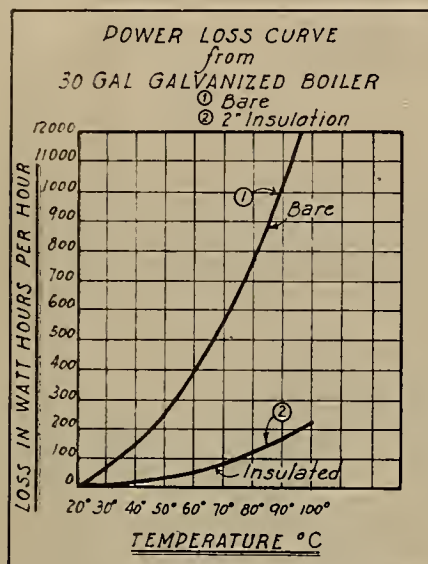
Analyzing the above losses, it will be found that the greatest proportion of the radiation has occurred from the tank. This would seem to indicate that the rest of the system could remain uncovered without serious lowering of efficiency. This would be the case if it were not for the fact that, if the water in the pipes is allowed to cool, the cold water will drop down to the tank and tend to lower the tank temperature, then more hot water will rise and be cooled, etc. This internal circulation in the pipes will naturally cause an increase of fuel consumption. No data are offered supporting this as none are available, but tests would undoubtedly prove surprising.

If the radiation losses are to be kept at a minimum, a good material is necessary. The first consideration is, of course, its insulation efficiency, and then how long and under how severe conditions the material will continue to produce this efficiency. Vacuum is the best insulation obtainable but, except for special uses, as in vacuum bottles, its cost is too high because of the costly container. Next best is still air, but air confined where the surrounding temperature is not equal will not remain still but will circulate and endeavor to equalize the temperatures. This is

what takes place in a room, one side of which is exposed to the sun. A circulation is set up which will in time heat all four walls to practically the same temperature. It is readily seen why vacuum is such an excellent insulator as in a perfect vacuum circulation is impossible. The problem is, therefore, to keep the air circulation down. Where there is a temperature difference this is impossible but it is possible to confine it to a small area. This is done by producing materials that consist of very small confined air spaces. In each one of these circulation takes place, as in the room mentioned above, but the cells of air being so small, circulation hardly has a chance to produce results. The larger these little cells are, the poorer the material as an insulator.

There are some materials that are naturally good insulators in some cases; wood, for instance, is an insulator of sorts, as it contains confined air spaces. Some woods are better insulators than others, some of the rarer ones that are light in weight being excellent but not very plentiful, however. The value of hollow tiles for buildings in extreme temperature conditions brings out the value of confined air spaces for insulation. Thus to produce the desired lowering of radiation losses the material must be chosen with care, and the insulating efficiency inquired into from a reliable source.

Conditions to be contended with even in domestic work are quite severe, and the durability is a large factor. Leaks in the boiler are probably the greatest source of trouble. They do occur and will render the boiler covering useless if the material will disintegrate in water, and, of course, in order to mend

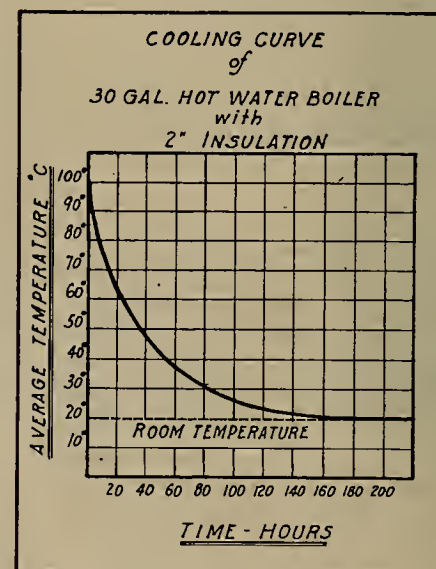


Curves showing energy losses from a 30-gal. galvanized hot water tank, when bare and when covered with 2-in. insulation. The savings which can be effected by the application of good insulation decrease sales resistance and make satisfied customers.

tion losses and causes a corresponding increase in the power bill. However, the non-technical owner cannot be blamed for his ignorance as he pays his architect or builder for advice and relies on their judgment. The buying public should receive and profit by the knowledge of industrial engineers and owners on the value of proper insulation, especially as often the former's fuel is more expensive per unit.

A mechanical engineer in designing an industrial plant includes complete insulation in his specifications. Yet probably 90 per cent of the specifications written for homes and apartment houses make no mention of the insulating requirements. In fact, the architect often makes its use impossible by placing the range boiler in a cupboard too small to allow the installing of efficient insulation, and frequently does not see that the cupboard is sealed on the top and bottom to prevent unnecessary circulation.

A good boiler jacket should be at least 2 in. thick and the workmen need another 2 in. to apply it. Somewhat similar obstacles are placed in the path of the owner that wants to install pipe covering. The plumber has been allowed to run his pipes through the studding or plates completely on one side or the other, thereby not leaving ample clearance between the pipes and the plaster for the pipe covering. Boiler jackets and pipe covering are manufactured

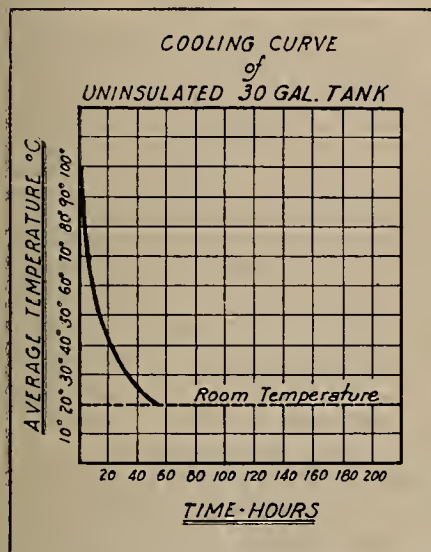


Curve showing cooling rate of a 30-gal. galvanized hot water tank with 2-in. insulation.

the boiler, the jacket should be removable so that it can be used again. It should be so constructed that it will remain solidly in place because if it sags, a circulation will be set up and produce heat losses. Where the boiler is to be in the kitchen and subject to cooking odors, a material should be obtained that will not absorb these odors and thereby become objectionable and possibly mouldy.

Practically the same requirements are to be looked for in the selecting of pipe covering. All fittings should be covered with a good quality of insulating cement.

Smooth surfaces do not radiate heat as readily as rough, nor do light surfaces radiate as fast as dark. These differences are small with the temperatures encountered in domestic work, but if kept in mind often can be turned into savings without additional outlay. The outer covering of boilers and pipe should be as light and as smooth as practical. For general purposes, it may be remembered that the radiation of light and heat are practically the same.



Curve showing cooling rate of a 30-gal. galvanized hot water tank when not insulated.

The following extracts from tests of the Engineering Experiment Station of the University of Illinois support the statement made elsewhere on the use of single layers of asbestos paper. These tests were conducted mainly to determine the proper covering for furnace air ducts but can be applied to other work with correction for temperature. Bright I C Tin uncovered was used as the basis of comparison but it is mentioned that galvanized iron can be considered as of practically equal efficiency.

Material	Relative Efficiency
1. Approved insulating material.....	392.0
2. Uncovered tin	100.0
3. 7 thicknesses of 12-lb. paper.....	97.0
4. 1 thickness of 10-lb. asbestos paper....	61.5

Roseburg Has Modern Apartment House with Electric Ranges

Through the efforts of the Hudson Electric Company, Roseburg, Ore., that city now has a thoroughly modern apartment house of fifty-three apartments. This building, known as the Kohlhausen Apartments, is completed and partly occupied. Each apartment has an electric range of the latest model and is otherwise up-to-date. The total electrical installation in the building amounts to approximately \$14,000 and was laid out and completed by the electrical contractor.

Model Kitchen Helps Department Store Sell Electric Equipment

A model kitchen and back porch with full equipment of electrical appliances has been installed on the sales floor of Barker Bros., the well known household department store of Los Angeles. This is in the form of a booth open on two sides, of the normal size of a kitchen, finished throughout in white enamel with a most attractive interior finish. Blue and white checked curtains finish the windows.

Here the major kitchen and laundry appliances are installed exactly as they would be in the customer's home. The range is connected and indeed, is used almost daily to cook actual food, so that there is generally something to sample to convince the prospect of the operating qualities of the range. The hot

by the exhibition or the appetizing odors of baking and stop in to inquire concerning some particular equipment in which they are interested.

One of the chief values of the model kitchen, besides its excellent advertising value, is the practical solution it offers to the problem of demonstrating appliances. The store furnishes demonstrations in the customer's home after the article is installed if so desired, but the possibility of demonstrating the same article on the store floor makes this often unnecessary. Either the purchaser will have the opportunity of learning how the appliance is operated before buying it, or she will gladly come down to the store kitchen to attend a demonstration there. This means an appreciable saving for the service department and does much to offset the original cost of the exhibit itself.



The model kitchen installed by Barker Bros., Los Angeles, not only is complete in its electrical equipment, but it even has a convenience outlet or two placed so that the customer may sense the convenience of adequate wiring in the use of the electrical kitchen accessories.

water heater provides hot water in the sink, so that it is possible to illustrate just how quickly hot water is available after the faucet is turned on. Dishes are washed in the dish washer with equal success. In the electric refrigerator are kept the foodstuffs already cooked or ready for later preparation for use in the range. In addition the kitchen contains an electric cooker, a mixing machine and an electric steam radiator. White enamel finished kitchen table and kitchen cabinet with all the necessary small utensils complete the outfit.

On the back porch is complete laundry equipment with tubs, water heater, washing machine and ironer. The laundry room is finished in typical back porch fashion in gray with screen windows.

A demonstrator is usually present in the kitchen to explain equipment. Salesmen bring their customers here always as the installed articles offer a much better basis for sales argument than do the unattached articles on the floor. In addition, many who are passing through the department are attracted

C. H. Carter, of C. H. Carter Electric Company, Sacramento, Calif., was in San Francisco recently to attend the meeting of the Electrical Wholesalers' Credit Club.



These huskies from the Electric Appliance Company's San Francisco force are "there" and "right" when it comes to the gallop-in dominoes. (Left to right) John Tait, "Jeff" Ricconi, Lloyd Carr, Henry Sacht, and Ray Wertz say that this is one of the best known ways to spend the short interval after "ham and" before returning to work.

JOBBER, DEALER AND SALES AGENT



Traveling Electrical Display Attracts Attention

Chicago Manufacturer and Distributor Puts Display on Truck to Permit Showing of Lines from Coast to Coast

To advertise and display the lines of 37 electrical manufacturers was the aim of the Peerless Light Company of Chicago, Ill., when it decided to put an electrical display on a truck body and have the truck tour the United States. In addition to promoting sales for the lines the company handles, the aim of the concern, which is a manufacturer and distributor, was to increase the business of local dealers by attracting attention to electrical devices.

The idea, as planned by B. F. Myers, provided for the equipping of a truck with an attractive body in which there would be room for displaying a considerable amount of electrical appliances,

from the front to the back of the body. Table lamps and wall fixtures are attractively arranged in each of these display windows and are illuminated at night.

A radio receiving outfit is part of the equipment of the traveling exhibit. A collapsible antenna, using four barrel type strands, is mounted on the top of the truck body. While the truck is traveling from town to town the aerial is lowered to the car top and is securely lashed there. A system of pulleys permits the raising of the aerial in a short time.

The truck, known as the "Peerless Sales Palace," started from Chicago

being made at nearly every city and town.

The general practice has been to spend a day in the larger communities, arrangements being made to hold a parade in the evening. At night the lamps that are on display in the miniature windows are lighted, low voltage lamps being used in the place of regular lamps. A storage battery supplies current for operating the radio equipment and the lights. In addition to conducting parades in the evening, Mr. Myers, who is in charge of the exhibit, H. A. Silverstein, in charge of sales, and W. R. Hirsh, Mr. Silverstein's assistant, arrange for radio concerts which are presented to the public. These concerts are held in front of the store of one of the local electrical contractor-dealers, the local electrical man and the men in charge of the exhibit cooperating to secure a crowd.



The "Peerless Sales Palace" in front of the Huggins Electric Company store in Trinidad, Colo. Five of the miniature show windows that are visible in the picture give an idea of the display value of the truck.

fixtures and radio equipment. This truck was built and designed to make the trip from coast to coast, the plan being to spend approximately eighteen months while making the 10,000-mile trip.

The truck is so constructed that persons may be taken inside of it, where there is a small stock room fitted with bins and drawers. A full line of samples is carried along with fixture parts and supplies, radio material, heating appliances and table lamps. Show windows, which are visible at all times, are also provided in connection with the exhibit. Both sides of the truck have five of these miniature windows arranged

Sept. 5, 1923, and stopped at Davenport, Iowa, Peoria, Ill., St. Louis, Mo., Kansas City and Wichita, Kan., and many smaller places. The truck then traveled through Kansas and Colorado, stopping at nearly all of the cities and towns en route. From Trinidad the truck followed the Santa Fe Trail to Los Angeles. It is at the present time working from Los Angeles to San Francisco. Stops were also made at smaller towns than those recorded above. From San Francisco the truck will go north and then east by the northern route. After reaching the eastern coast the exhibit will go to Tampa and return to Chicago, stops

Denver Outdoor Christmas Trees Prove to Be Popular

That the electrical Christmas idea plays no small part in the holiday community life of Denver, Colo., is reflected in the following editorial from the Denver Post:

But there is none so highbrow nor one so lowbrow that he cannot appreciate and enjoy the indescribable splendor and beauty of Denver's municipal Christmas trees and their setting.

There are bigger cities than Denver, but there is none more attractive. There are municipal Christmas trappings in cities other than Denver, but nowhere is there one that measures up to Denver's in loveliness or in the perfection of the holiday setting.

Denver is the municipal Christmas tree blazer. The first great tree illuminated in the civic center a few years ago illuminated the way for other cities, and the Denver idea is being copied all over the country.

That is not all. Denver, as a city, set an example for its citizens which has been a source of pleasure and inspiration for thousands and thousands. Numerous citizens who have evergreen trees growing in their yards string these trees with colored lights each Christmas and illuminate them nightly from Christmas eve until New Year night.

These living Christmas trees, of incomparable grace by day, are wondrous in the multi-colored blaze of Christmas lights and they don't have to be cut down to perform their holiday season service.

Some day Denver will take a tip from its citizens who have followed the municipal Christmas tree example. And then living giants of evergreen or spruce will grow in the civic center to adorn it in the summer as well as to illuminate at Christmas.

According to S. W. Bishop, executive manager of the Electrical Cooperative League of Denver, the interest in the outdoor Christmas tree is one of the reasons why the sale of Christmas tree lighting sets in Denver during the recent holidays broke all previous records. The Electrical Cooperative League of that city, which has been one of the prime-movers for outdoor illumination, has reported gratifying results from its campaign.

Western Dealers Place in National Window Contest

Fourteen of Fifty-One Prizes Awarded to Electrical and Radio Dealers With Stores in Western States

Taking 14 prizes out of a total of 51 awarded in the window display contest conducted by E. T. Cunningham, Inc., of San Francisco, Calif., western electrical and radio dealers have shown that they have learned the art of window decorating. At the same time these prize winners, in addition to nearly two thousand others who entered the contest, have shown that they appreciate the sales value of the window display.

The contest was arranged primarily to increase the sale of Cunningham radio tubes by dealers located all over the United States and according to reports, the aim was achieved. Dealers participating in the contest, from the one receiving the first prize to those who did not place, found that the feature window displays that were used during the campaign were exceedingly useful in stimulating sales.

The provisions of the contest stated that it was open only to electrical and radio dealers and that it would last for only one week. To further add to the pulling powers of the windows, the Cunningham company designated the week as "National Tube Week." A large amount of national and local advertising was tied in with the special campaign, thus adding considerably to the sales value of the window displays.

Over two thousand electrical and radio dealers entered the contest. Three judges spent a large amount of time in determining which of the entries made in the contest were entitled to the prizes. Artistic effect, original theme, and the educational sales value of the window display were points that were used by the judges in selecting the winners.

First prize of \$1,000 was awarded to the Lester Radio Shop, Los Angeles, Calif., and the third prize, carrying with it an award of \$500, was won by another Los Angeles firm, The Electrical Appliance Shop. The winner of the first prize is an exclusive radio dealer and the third prize winner conducts a general electrical retail store with a special radio department.

The window used by the Lester Radio Shop was one of small dimensions, but despite this fact, a most attractive display was presented. The display was designed to show how radio served the world. In the center background appeared a large arch under which was placed a radio receiving outfit that was connected to miniature models of important world events. A card above the receiving set notified the public that radio would bring news of these events into any home. Among the scenes reproduced with the use of the models was the wreckage in Japan following the earthquake. Beside this appeared a card bearing the message, "Except for radio Japan was cut off from the world." The wreck of the U. S. destroyers was also shown and radio was given credit for bringing aid to the stranded vessels. Three of the scenes showed how radio provides entertainment in the home. One brought to the attention of the person viewing the window, the fact that radio would bring to the home, music and dialogue from the theater. A

second one brought to mind the fact that the results of prize fights were broadcast and could be received at home by the owner of a radio set, while a third model was accompanied by a card which stated that, "Eloquent sermons and inspiring music are brought into your home via radio."

From each of the models ribbons led to the center of the arch and down to the radio receiving set. The tubes being featured in the window were placed at various points in order that they might attract the most attention. The arch covering the receiving set carried the wording, "Cunningham Tubes Did It!"

A display of an entirely different character won the third prize in the contest. The Electrical Appliance Shop devoted a long narrow window to the display of the tubes. The general idea that was to be carried out in the window was that radio served all classes of humanity—those who lived in large city homes, those who were at sea and those who lived in the remote corners of the world.

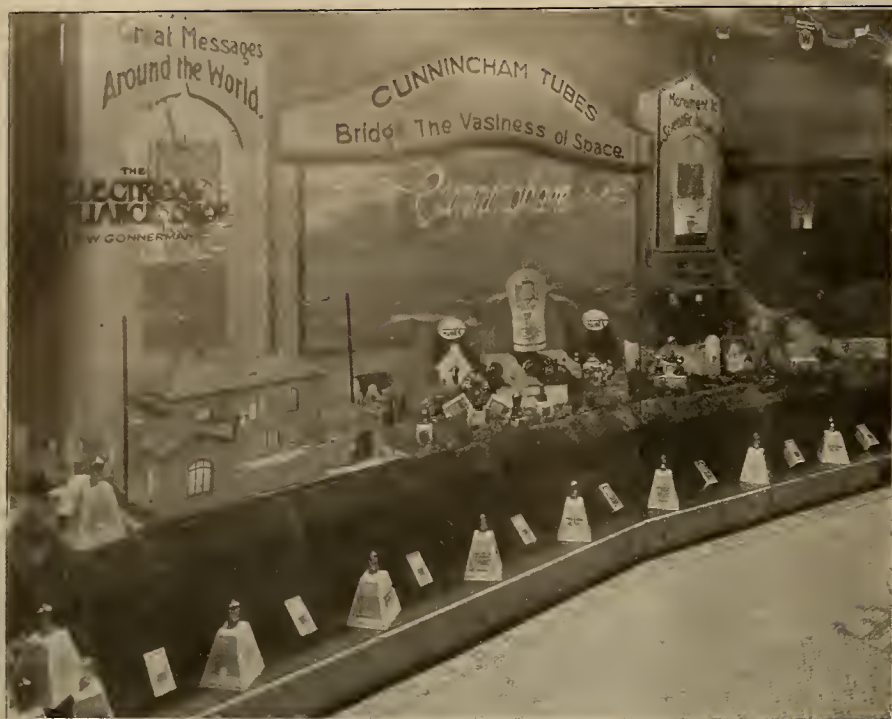
At the extreme left side of the window was a model of a large city residence. An aerial was erected over this dwelling and behind the model a greatly magnified radio tube was portrayed on a piece of cardboard which also carried the wording, "Radio Carries Messages Around the World." The panel board of a receiving set occupied the center position of the window in connection with the shore by means of radio. At the right of the window was a model of a log cabin erected in the wilderness, but fitted with a radio outfit in order that its occupants might hear from the rest of the world daily.

These models were all arranged on a raised platform, thus bringing the display closer to the level of the pedestrian's eyes. At the base of the platform boxes of tubes and others set in cardboard standards were placed in alternate rows.

Twelve other electrical and radio dealers in the West were awarded prizes by the judges in the contest. These dealers in addition to receiving honorable mention were each given a prize of \$50. The twelve firms receiving the honorable mention were: Equipment Sales Company, San Diego, Calif.; Fortner Camera Supply Company, Sterling, Colo.; Long Beach Radio Shop, Long Beach, Calif.; Murphy Maclay Hard-



The Lester Radio Shop with the window display reproduced above, won first prize in the Cunningham national window trim contest.



Third prize in the window decorating contest was awarded to the Electrical Appliance Shop.

ware Company, Great Falls, Mont.; Prest Electric Company, San Bernardino, Calif.; QST Radio Shop, Tacoma, Wash.; E. M. Sargent Company, Oakland, Calif.; Stoehrer's Electric Shop,

Oxnard, Calif.; The Motor Supply Company, Seattle, Wash.; The Radio Distributors, Long Beach, Calif.; Weed's Radio Shop, Portland, Ore., and Willapa Electric Company, Raymond, Wash.

Use County Fairs to Develop Appliance Prospects

Valley Electrical Supply Company Attracts Crowds to Display Presented at County Festival

Attractive displays of electrical appliances and merchandise have increased greatly in number in the past few years and dealers have been devoting more attention to this phase of merchandising. It has come to be recognized that the appeal through the eye is much more powerful than through the ear and that women, for example, will buy much more readily when they can see the device—particularly if it is in operation—than they will when they are merely told about it. This is especially true of the heavier and more expensive appliances such as electric ranges, water heaters and air heaters. Whether this is because of the prices of these articles or is because of the radical departure from established ideas

has never been fully determined. It is, however, certain that display is a powerful factor in sales work.

This psychological fact was recognized and taken advantage of by the Valley Electrical Supply Company, of Fresno, Calif., at the recent Fresno County Fair. Having decided to take space at this exhibit, the company then bent its effort towards installing a display that would not only invite but would command attention from all who passed their booth. Consequently an exceptional amount of thought and attention was given to the construction and arrangement of the booth in order that it might have the maximum drawing power.

The booth was L-shaped, built of

beaver board and was 25 ft. on each side, thus giving a 50-ft. frontage over all. The side walls were tinted in old rose, as were the background and floor, while the draperies and decorations were of bright gold. Particular attention was paid to the matter of illumination. Cove lighting was used for the general scheme and a total of 14,000 watts was placed in the ceiling outlets. This was placed just behind the front arches of the booth and thus gave an appearance very similar to a large show window. The reflection of light from the floor and walls gave a comfortable and cozy feeling and added to the attractiveness of the booth.

The arrangement of the appliances was carefully thought out in order that they might be placed not only in the order of their importance as domestic devices but also in the order in which they would have the greatest sales value. Directly in the center, two electric ranges were mounted on a revolving platform which rotated throughout the hours during which the exhibition was open to the public. This moving display proved well worth while as it drew attention to the booth. The arrangement of aisles was such that when once drawn to the booth the prospect received a natural invitation to enter and to look over the other appliances on display. Four salesmen were on hand at all times to receive visitors to the booth and to explain the operation of the various devices as well as to answer all questions which might be asked. The arrangement of aisles in the booth made it very easy for the salesmen to pilot prospects throughout the entire exhibit and made easier and more successful the explanation of the various appliances.

A feature of the exhibit which commanded a great deal of attention and which aroused the interest of the women was the actual cooking which was done on two electric ranges.

It is estimated that at least 80,000 people out of the 95,000 who visited the fair also visited the booth. Each person who stopped at this exhibit was given a ticket which entitled him or her to a chance on a drawing held each night and the prize for which was some electrical appliance. Space was provided on the backs of these tickets for the salesmen to make such follow-up notes as would help in closing sales at later dates. Inasmuch as all tickets were deposited in order to take part in the daily drawings a vast amount of prospect material and data was obtained.

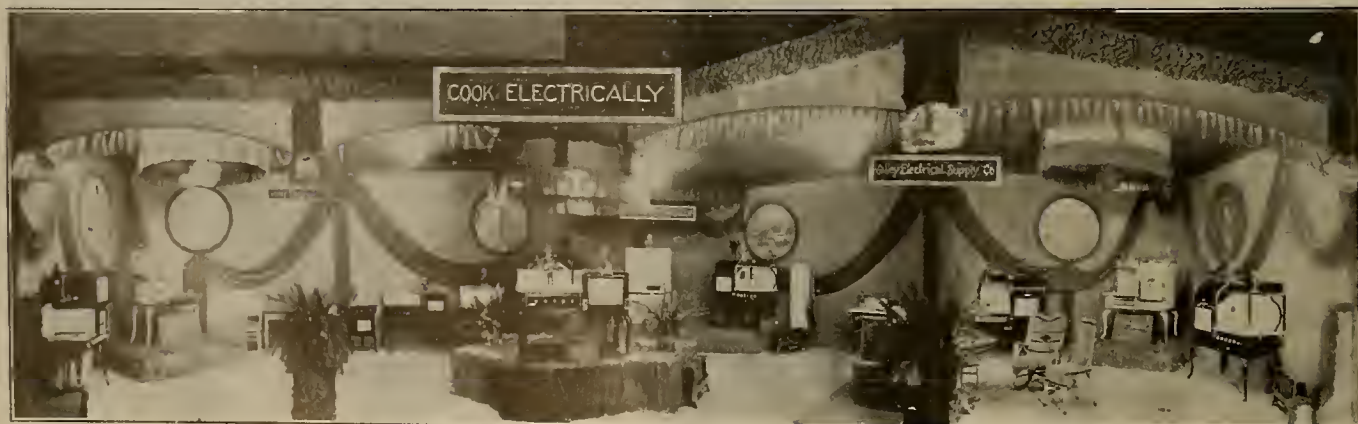


Exhibit of the Valley Electrical Supply Company at the Fresno County Fair.

The Point System a Base for Salesmen's Quotas

Spokane Company Uses Differential Point Basis to Get Equal Means of Rewarding Electric Washer Salesmen

To develop a system of reimbursing and rewarding salesmen during any particular sales campaign has been found by most sales managers to be a most difficult problem. The aim of the sales manager is of course to increase sales the greatest amount possible and at the same time reward salesmen in proportion to their share in the gross volume.

Total volume of sales as a means of rewarding salesmen is not a fair way to handle the problem because as all salesmen know, the opportunities for making sales are not the same in each salesman's territory. Some provision must therefore be made for the varying opportunities of the salesmen.

The quota system, when taking into consideration centers of wealth, population, etc., has been found to be one of the most just means of determining the awards to be made to salesmen at the end of the sales campaign, because under this method of apportioning the volume that it is designed to secure, allowances can be made for the territories covered by the various salesmen. This system is exceedingly valuable when only one item is included in the drive being conducted, or when the sales manager does not wish to push any one item listed among those included in the campaign. If, on the other hand, he desires to push some of the articles more than others, the quota method will need some slight alterations.

In a sales campaign conducted in Spokane, Wash., recently the Washington Water Power Company featured a line of electric washing machines, using the quota system among its salesmen with only minor alterations. In the first place, it was determined that the quota assigned to each salesman should be listed in points and that the three types of washing machines being featured should each be given a different rating in the point system. Each salesman was given a quota based on total points on the following arrangement:

For the sale of a Thor No. 32.....	20 points
For the sale of a Thor No. 25.....	15 points
For the sale of a Hurley No. 45.....	10 points

The total quota in points given each of the six residential salesmen working in Spokane, depended upon the size and character of the individual territory. The Washington Water Power Company agreed to give a bonus of \$20 to each salesman who reached the quota assigned to him and in addition salesmen who scored points over their quotas received 5 cents per point for each point over the quota. The company also set aside 50 cents for each machine sold and placed this sum in a pool which was divided each week among the three salesmen making the highest percentage of their quotas. The salesman with the highest percentage received one-half of the pool, the second highest one-third and the third man one-sixth.

Additional compensation for salesmen was provided by the Hurley Machine Company and the Washington Electric Supply Company of Spokane, distributor of Thor products. Each of these concerns donated \$25 to be awarded in two prizes. The first prize of \$30 went to the salesman who oversold his quota by the highest percentage and a second

prize of \$20 was awarded to the man with the second highest percentage of points over his quota. The first prize was won by A. E. LaCroix who oversold his quota by 57 per cent, and J. R. Weideman with total points 15 per cent above his quota won the second prize.

As a result of the sales campaign, the Washington Water Power Company feels that the quota-point system that it used was not only a means of setting an equal goal for each salesman but that it also tended to cause the salesmen to exert especial effort to sell the higher priced class of washing machines. This theory is substantiated by the results of the sales which were as follows:

Thor No. 32.....	27 per cent of sales
Thor No. 25.....	42 per cent of sales
Hurley No. 45	31 per cent of sales

The sales campaign extended over a period of one month, starting the first of November and closing on the last of the month. During that time 407 washing machines were sold by the company's salesmen in Spokane and in towns on the lines of the company. Gross sales amounted to \$55,000, more than double the number of machines being sold than in a similar campaign a year previous.

To aid the salesmen during the campaign a broadside was sent to each customer on the central station company's lines. This piece of literature mentioned each of the three washing machines being featured in the sales campaign. Advertising was also used in three of the Spokane daily papers. Approximately 1,000 in. of space were used in telling the public of the advantages of electric washing machines.

WHY NOT SMILE ALL OF THE TIME?

By JOE OSIER

"To give grudgingly is really not to give, but to have taken away."

This proverb, I firmly believe should be learned, preached and practiced by every man engaged in the electrical industry—

Provided he purposes prospering and—

I know that the real businessman will discover that the adoption and use of this saying will mean an extra influx of—

Tin in the till—because—

It is of little value to advertise superior service unless that service is given gladly—

Given with a smile.

Anything agreed to with a scowl and surly words, might as well not be conceded—still—

In spite of the preachments, above produced, I do not mean to intimate that the contractor-dealer, jobber or anyone in the electrical game should—

Turn over his shop, store or place of business to a customer because that customer comes wolfing with a grievance—

Real or fancied,—because—

Ofttimes it is wisdom to "Yes" and not yield; however—

"Yessing" or yielding—do it with a smile—for as the poet says:—

"A smile is worth a hundred groans in any market."

Too many businessmen, or men in business, because they have Ol' John Public's—

Sugar in their socks—

Bully and browbeat that little, inoffensive, mutton chop whiskered individual when he comes to register a complaint. Seeing they have it on him—



Why not a little of the pup's genuine effusiveness when handling our trade?

Like a tent—

They yell him down—talk him out of the league and flatten him like a phonograph record—

Even though they know his claims are correct and his cause just—and—

What do they gain?

And I answer: They win the argument and lose a cash customer—and—

The businessman who loses a paying patron is paging trouble and will soon be headed down the long, wrong trail—

Winning arguments with himself, only.



Happy moments for the boss when he reads the returns from "SMILE SERVICE."

Naturally, misunderstandings will arise and the Johns and Janes will storm the gates and demand blood, but—

The smart men in the game will hold their tongues and tempers and—if they smile—

Will keep the customers coming.

Go ahead and criticise—Ku Klux me if that is your pleasure—and, still I'll say:—

Do it with a smile. A smile costs nothing but it is a wonderful good will builder.

Checking Up on the Number of Appliances in Use

Greeley Company Gives Service to Customers While Making Survey of Residential Application of Electricity

To secure an accurate count of the actual number and nature of electrical appliances in use in the homes of any city has been found to be a most difficult problem. When the concern desiring to secure the information also wishes to know just what appliances each particular housewife owns the task of obtaining the results becomes even more difficult than before.

When such definite information is needed plans for some sort of a survey must be prepared. A questionnaire sent through the mails if sent to a large number of homes will give a representative answer showing the average number of appliances in use, but the results obtained will not give the concern sending the questionnaire out, direct information which will tell what appliances are in use in individual homes.

To determine the character of the electrical equipment in use in any particular home, the personal solicitor has been found to be the only satisfactory investigator and even then much diplomacy and tact must be used. The average housewife does not like to be questioned as to what she has in her home and in many cases will refuse to give the investigator any information at all.

If the man who comes to make the survey arrives with only a list of questions to be put to the housewife, he will find, in most cases, that the results will be far from satisfactory.

If, however, the investigator calls as a person who is prepared to render some service to the housewife, he will discover that in return for his aid she will be willing to assist him. Thus if the investigator can announce himself as a person who is sent first as a service representative, then the housewife will be more ready to admit him to her home and to answer any questions that he may ask in connection with his service survey.

Toward the end of securing definite information regarding the ownership and use of electrical appliances and illuminating devices by its customers, the Home Gas & Electric Company of Greeley, Colo., has recently adopted a plan which has been found to be most satisfactory. The company has followed the example set by some of the larger central station companies, in various parts of the country, and has started a residence survey of its customers. The survey was called a meter test and inspection as the investigator was a man

fitted to do these things in addition to securing the desired information.

The Greeley central station company does not manufacture or distribute gas as might be indicated from the name and consequently the present survey is confined to conditions solely electrical. Although the survey was started a number of weeks ago, no complete analysis of figures has been made as yet, according to L. R. Storey, general superintendent of the company under whose direction the campaign is being staged.

However, the information obtained to date has in many cases astounded both Mr. Storey and Fred Norcross, general manager of the company, and former president of the Colorado Public Service Association. To find that certain customers were living in "electrical homes," judging from the reported number of appliances owned and used, proved to be a considerable surprise to officials of the company.

When conditions diametrically opposite were reported, the commercial department was immediately provided with data on the lack of appliances in order that a representative of the company could call at the earliest opportunity, to sell anything from an iron to a washing machine. No definite figures are available on this follow-up but it is definitely known that more good leads have been provided as the result of the survey than from any other system yet tried in Greeley, and inasmuch as appliance sales are rapidly increasing, considerable credit is given to the survey.

That electric irons lead all other appliances in everyday use is definitely known. Just whether that condition prevails in one locality or to what extent it will prove general, the information is lacking. However, in the case of the first 300 homes visited in Greeley, it was found that over 90 per cent were equipped with electric irons. As soon as the inspection is completed in that city, data will be compiled on the use of other appliances and a similar scheme will be employed in making the survey of the other eight communities served by the company, according to Mr. Storey.

Greeley, a city with a population of approximately 14,000, has about 4,500 central station customers. Naturally, the operating and commercial departments are not sufficiently large to permit the frequent withdrawal of personnel required to make the inspection and survey. However one man, a competent meter reader, was relieved from that work to carry on the special mission and at present is devoting all his time to it.

According to Mr. Norcross, the general manager, there is an underlying idea of improved public relations in the survey. In numerous instances, the opportunity has been presented to improve the already good relationship with a number of customers by showing them the way to better illumination and more efficient usage of labor-saving equipment.

The survey is a house-to-house proposition and a separate report is being made on each house visited. The blank forms employed are designed to give a complete report on the meter installation, also the appliances, heavy duty equipment, lamps, wattage, and total connected load.

METER TEST AND INSPECTION

Order No. _____ Date _____ By _____ Meter Co. No. _____

Name _____ Town _____ House No. _____ Street _____

Shop _____ Periodic _____ Cust. Prem _____ Complaint _____ Inet. _____

Flat Rate Service _____

Neutral Tagged-Found _____ Left _____ Series Trans. _____ Pot. Trans. _____

Conditions Found-Service Wires _____ Meter Loop _____ Main Switch _____

Creep _____ Seal _____ Main Fuses _____ Wiring Grounded _____

Meter Location _____

METER DATA: Co. No. _____ Mfg. No. _____ Amps _____ Volts _____ Phase _____ Wire _____

Make _____ Index _____ Dial Const. _____ Disc. Const. _____

BEFORE ADJUSTMENT				AFTER ADJUSTMENT			
REVOLUTIONS		Stand. Const.	Acc.	REVOLUTIONS		Stand. Const.	Acc.
Coil No. 1	Meter	Standard		Meter	Standard		
1/10 Load							
Full Load							

JEWEL { Good, S.
Bad, D. _____

MAGNETS { Clean, Dusty,
Iron Fillings, _____

TOP BEARING { High,
Low, O. K. _____

DIAL CONDITION _____ TESTED BY _____ DATE _____

Appliances	Watts		
Iron		Number of Active Rooms	
Washer		Sockets in Active Rooms	
Heater		Av. Size of Lamps	
Sweeper		Watts in Active Rooms	
Toaster		Total Number of Rooms	
Grill		Total Number of Sockets	
Percolator		Total Lamps Load	
		Total Appliances	
Total Appl.		Watts, Lamps & Appliances	
Range			
Rectifier			
Motor		Power Load Connected	
		Total Connected Load	

READING. B. T. _____ A. T. _____

REMARKS: _____

Reports in the survey being made by the Home Gas & Electric Company of Greeley, Colo., are made on this form which is made out in duplicate.



Exterior view of the electrical double bungalow recently opened to the people of Denver, Colo.

Electrical Double Bungalow Displayed in Denver

Descriptive Booklet Presented to Visitors Tells of Advantages of Having Home Completely Electrified

Is the public thirsty for electric home information? Carl S. Homsher of the A to Z Electrical Company, Denver, Colo., contractor, and the T. D. Harris Investment Company, home builders, following an electrical double bungalow exhibition recently put on cooperatively by the two, have answered the question in the affirmative. Mr. Homsher had the double bungalow built for himself and while he was doing this, he made it a model of electrical wiring and equipment. He was proud of the home, and so was the building company.

The two saw an opportunity to put on an exhibition which would react to the advertising benefit of them both. They advertised the exhibition modestly in a Sunday paper, and that day visitors swamped the sponsors. Fifteen hundred people went through the home on the first day it was opened. It was kept open throughout the week, from three o'clock to nine o'clock daily. On many nights attendance was so great the closing hour had to be moved ahead to ten o'clock.

The fact that Denver had a cooperative model electric home had not taken the edge off the public's interest in the demonstration, but seemingly had the effect of whetting it. Since this display, a second cooperative home has been visited by 8,982 people.

The electrical double bungalow gave the public an exhibition of a model residence structure of a new type. While the cost of the present bungalow, as equipped, is not given, the information that the investment company offers to build a duplicate, except for the lot, for \$17,500 is pertinent.

As regards its basis, this electrical double bungalow also has individual and very interesting features. The enterprise was conducted to produce advertising benefit directly for two parties—a home building company and an electrical contractor. Both parties furnished guides for the home. The building company considered the home, as an advertising enterprise, so important that it practically suspended most other selling activities, including classified

advertising, and put nearly its whole force on the electrical double bungalow enterprise.

Neither party made any secret of satisfaction at the number of live prospects secured directly, and both realized the prestige building and general good will advertising benefit of the exhibition.

A 12-page booklet was distributed to all visitors. In makeup, this reflected the distinctive sponsorship under which the home was exhibited, having marked differences from the 1922 booklet distributed by the Electrical Cooperative League of Denver. After a preface, the principal topic treated in detail was, "Electrical Wiring As It Should Be in a Modern Home." The following quotation from this will indicate the editorial treatment, besides furnishing the reader specific information concerning the bungalow itself:

"The number of light outlets, switches and convenience outlets and type of fixtures used in this modern bungalow are as follows:

"Front Porch—One bracket outlet with a Verd green lantern and illuminated house number, controlled from both inside and out by means of 3-way switches. One door push to operate bell in kitchen.

"Living Room—One ceiling outlet with a 5-light butler silver and black candle fixture, controlled with switch at front door. Three duplex convenience outlets or receptacles in base board and one in center of floor.

"Dining Room—One center ceiling outlet with an enclosed unit of radiant decorative glass of Adams and Blue with hanger of butler silver and black, controlled with two 3-way switches at kitchen and hall doors. One duplex outlet in baseboard, one in center of floor and one in wall near sideboard. One duplex plug for radio outlet in baseboard. One daisy door tread under dining room table to operate a miniature buzzer in kitchen.

"Front Bedroom—One center ceiling outlet with an enclosed unit, controlled

with switch. Two duplex convenience outlets in baseboard and one in wall.

"Rear Bedroom—One ceiling outlet with a 3-light candle butler finished fixture and decorative candle shades, controlled with switch. One duplex convenience outlet in baseboard and one in wall. Each of the bedroom closets has one ceiling outlet with automatic door switch to control same. The fixtures are chain pendants provided with pull chain sockets so as to make it possible to turn off light if desired to leave door open.

"Sleeping Porch—One ceiling outlet with chain pendant, shade and frosted lamp, controlled with switch, and one duplex wall receptacle.

"Center Hall—One ceiling outlet with ceiling fixture and switch.

"Bathroom—One ceiling outlet, controlled with wall switch. Two bracket outlets with keyless receptacles and 25-watt frosted lamps, controlled with switch. One duplex convenience outlet.

"Kitchen—One ceiling center outlet with an enclosed unit made of radiant glass, controlled with switch. One bracket outlet over sink, independently controlled by pull chain, and fitted with a 50-watt white Mazda lamp. One exhaust fan in ceiling. (Special attention is called to this, as the owner has worked out a scheme whereby the fan is concealed and provided with a shutter to close if desired, and has used a switch that needs no oiling.) The fan is controlled with switch and "Bull's Eye Signal." One duplex convenience outlet in the wall near range, one over the table, one single plug at side of kitchen cabinet and one plug in base for electric refrigerator. One 12,000-watt electric range outlet is controlled with switches as required by city ordinance.

"Rear Porch—One ceiling outlet with black ceiling band and receptacle, operated at the same time as the center ceiling laundry, boiler room and coal bin lights, with a set of 3-way switches, one in kitchen and one at rear door entrance to basement. One 3-way switch to control garage and yard lights. One single convenience outlet. One door push to operate buzzer in kitchen. The rear porch also contains the light and power cabinets and meters. The bell-ringing transformer for bell and buzzers is placed in the light cabinet. The power cabinet has a 3-pole double throw switch to serve an electric range in kitchen and ironer in laundry."

Completing the description of the double bungalow in this manner, the booklet gave a list of the appliances of which the installation facilitated the use. Then—showing the special interests of the builder—came a list of "other comforts of the home" of a non-electrical nature.

A table was published of approximate operating cost in cents per hour of a long list of electrical appliances, also statistics showing the small percentage, relatively, paid for electrical labor in a well constructed home compared with other labor groups. Two pages were occupied with a list of the business firms which had participated in the erection and furnishing of the home.

The system adopted for showing was one whereby the same guide took a group all the way through the house. This was considered superior to the one-guide-for-each-room method.

INDUSTRIAL NEWS



Power Company Contests Rights of Aberdeen Municipal Project

The latest developments in the Wynooche power fight in the efforts of Aberdeen, Wash., to establish a municipal power plant with \$2,000,000 bonds recently voted, is the filing by the Grays Harbor Railway & Light Company on the Wynooche River water rights. The city is endeavoring to get these rights and additional water rights from Joseph Malinowski but has been restrained by a temporary injunction.

The light company has also entered the fight with a series of large display advertisements in the Grays Harbor newspapers, presenting the power company's side of the issue. Declaring itself to be "among the largest taxpayers in the county," the corporation states in its advertisements that its "organization would be vitally affected by the determination of Aberdeen to build a competing and unnecessary duplication of our facilities for serving them," and insists that its articles will be written on "broader, more disinterested grounds—the welfare and prosperity of the whole community."

A recent ad discussed the difficulty of securing an accurate and competent estimate of the cost of the proposed project, and attacked the cost estimates of the Skagit project under development by Seattle, and the Cushman power project recently started by Tacoma.

The light company's application contemplates an expenditure of \$1,700,000. While the city and company's plans are somewhat different both projects would cover practically the same portions of the river, and therefore be in direct conflict. It is by reason of the reservoir raising the waters upstream within the national forest that the company's application for permit was made to the Federal Power Commission, and it is taken as further indication that the company intends to contest to the limit the rights and project of the City of Aberdeen for the mastery of the electric power field of the Grays Harbor territory.

Public Service Company to Build New Denver Substation

Equipment has just been ordered by the Denver division of the Public Service Company of Colorado for a new substation in the main residential district, which when completed will connect the entire generating and transmission system of the city as planned by the engineering department of the company in connection with the future requirements for distribution when energy is supplied by the new Valmont steam plant, north of Denver. It will be located on the property now partly occupied by the Harrison Street gas holder.

The company has just completed the installation of a new 50-kw. motor-generator to supply direct current exclusively to the stoker motors in the boiler house of the local Lacombe station. The installation was supervised by W. D. Hardaway who will also be responsible for the interconnection with the new Harrison substation.

In keeping with the Doherty policy of making friends with the neighbors in the territory adjacent to substations and gas holders, the company has announced a prize contest for employees seeking a suitable name to designate the residential units, based on the landscaping and architectural design of those properties. V. L. Board, general superintendent of the company, heads this activity.

Last Unit of Long Lake Plant Now Being Installed

The fourth and last generator unit of the Long Lake development of the Washington Water Power Company was recently delivered by the General Electric Company and is now being installed. The spillway for this power plant is the second largest in the world and is located in a narrow gorge of the Spokane River, 35 miles west of the city of Spokane.

Each of the four units for this installation is a 17,400-kva., horizontal water-wheel driven generator with a capacity of 19,500 kva. with forced ventilation. Two units, developing 45,000 hp., were completed in 1913 and 1915 and the third was installed during 1917-1918. The last unit will bring the plant to the full capacity of 90,000 hp. for which it was originally constructed.

B. C. Electric Completes \$200,000 Transmission Line

The British Columbia Electric Railway Company has completed the 35-mile high-tension line from North Vancouver to Britannia Mines, at a cost of \$200,000, and the power was turned on for the first time on the second day in the year. The time of completion was opportune, as there have been severe frosts during the last few weeks, and severe cold effectively dries up Britannia Creek, which is the mining company's source of power. The contract between the mining and the electric companies is for a supply of between 4,500 and 6,000 hp., delivered at 34,000 volts, and is the biggest single contract for power that the electric company ever has made. The power is used as an auxiliary to the mining company's own power plant, such auxiliary power previously having been supplied by a steam plant.

Penstock at El Dorado Plant of Western States Co. Bursts

During the course of the preliminary filling of the recently completed penstock of the El Dorado plant of the Western States Gas & Electric Company on the American River near Placerville, Calif., one of the sections near the power house was ruptured by the pressure and opening of the plant has been delayed at least two weeks until another section can be rushed from the East. Damage other than to the pipe itself was comparatively slight, neither the plant nor the generating equipment being harmed.

The plant is designed for a head of 1,900 ft., of which approximately 1,800 ft. had been applied when the break occurred. At the point where the rupture occurred the penstock consists of 20-ft. sections of 30-in. lap welded pipe. The exact cause of the break has not been ascertained.

The Western States Gas & Electric Company had planned to have the new station on the line by Jan. 1, 1924. The accident will delay the opening at least two weeks.

Action on Power Is Delayed by San Francisco Supervisors

Voting on resolutions authorizing the California State Railroad Commission to prepare a valuation of the lines of the Pacific Gas and Electric Company and the Great Western Power Company serving San Francisco was postponed eight weeks at the last meeting of the retiring board of supervisors of that city on Jan. 7, 1924. The reason given for delaying the vote on the resolutions was that of allowing the incoming members of the board sufficient time to study the various proposals regarding the distribution of Hetch Hetchy power.

Supervisors who voted to delay action held that the question of water and not power was the more important and that a decision regarding the consummation of the water supply project should be reached before consideration was given to the municipal distribution of power.

California Oregon Power Co. Starts Link River Plant

Work on the new power house of the California Oregon Power Company on Link River has started as announced by Paul B. McKee, general manager of the company. The excavating work will be done on company force account. If all goes as planned the company will be ready soon to pour the concrete for the power plant foundation and install machinery. The plant will cost about \$500,000 and will have a capacity of 4,500 hp.

San Joaquin Will Spend Total of \$6,000,000 in 1924

Budget estimates of 1924 expenditures of the San Joaquin Light & Power Corporation and its subsidiary companies total more than \$6,000,000, according to A. Emory Wishon, general manager of the company.

Although the total is less than 1923, it actually provides more for extensions and general development work, as the cost of the new office building in Fresno was included in last year's outlay. The \$6,000,000 will take care of the requirements of the San Joaquin Light & Power Corporation, the Midland Counties Public Service Corporation and the Fresno City Water Corporation.

The San Joaquin Light & Power Corporation's expenditures will be in excess of \$5,500,000. The cost of additional distribution lines and services to supply new consumers throughout the valley is estimated at \$1,300,000. More than \$550,000 will be expended for improving present distribution lines and increasing substation capacities to handle the growth of the load. Enlargement of the ditches on the Crane Valley system to provide more generating capacity, further development work on the Kings River project, new transmission lines and general improvements to the company's fourteen power plants will require an outlay of \$500,000.

Other improvements in service, such as new gas holders and mains in Selma and Merced, gas mains in Bakersfield and water mains in Selma, buildings and sundry betterments will entail expenditures of \$650,000. In addition to this construction work of \$3,000,000, the corporation will expend \$2,500,000 in labor and materials for the operation of its electric, gas, water and railway systems.

The Midland Counties Public Service Corporation, operating in Coalinga and on the coast, plans extensions to its system to cost \$300,000, of which \$200,000 is to provide for lines and services to new consumers and \$100,000 for improvements in substations and existing lines.

The Fresno City Water Corporation, to provide water service to new homes, stores and industries in Fresno, will spend \$200,000. Of this amount, \$20,000 will be for new pumping plants and \$180,000 for enlargement of the distributing system. It is expected that the growth of Fresno in 1924 will require the laying of 75,000 feet of new mains to supply new consumers and to further improve the service.

Power Commission Threatens to Halt Girand Project

The Department of Justice has been requested by the Federal Power Commission to take steps to prevent James B. Girand from proceeding with the construction of his hydroelectric project at Diamond Creek on the Colorado River, according to dispatches from Washington, D. C. Mr. Girand is proceeding with the work under a permit from the Arizona State Water Commissioner which expired last month unless active operations on the job were commenced. The Federal Power Commission refused to grant a permit for the project several months ago until a definite decision on the Colorado River compact had been reached by the states

interested. Plans for the construction of a dam at Boulder Canyon by the Federal government are to be introduced before Congress by Representative Swing of California and it is believed that this may have something to do with the action of the power commission.

Federal Power Commission Grants Preliminary Idaho Permit

The Federal Power Commission has granted a preliminary permit to the Southern Idaho Land & Power Company at Weiser, Idaho, for the power project on Crane Creek in Washington County. The company proposes to build a diversion dam, storage reservoir and power house to have a capacity of 25,000 hp., which will be marketed on three irrigation projects in that vicinity.

Westinghouse Lets Contract for Second Emeryville Unit

The Westinghouse Electric & Manufacturing Company has let the contract for the construction of the second unit of its plant at Emeryville, Calif. The cost of this new factory is said to be approximately \$500,000 and construction work will be started at once by the Dinwiddie Construction Company, of San Francisco.

Among other features the new plant will contain a large assembling shop, repair shops, a zone warehouse, service shops and other facilities. The three buildings were designed by Bernard H. Prack, consulting architect of Pittsburgh, Pa., and will each be three stories high and will each have a frontage of 66 ft. In one wing of the unit all repairs to electrical machinery will be made and in this building also will be manufactured switch panels and switchboards. The second wing of this unit will be given over to assembling and the third wing will be devoted at present to storage.

The new plant will be located on Peladeau, Powell and Landregan Streets in the heart of the industrial section of Emeryville and will increase the manufacturing capacity of the company and at the same time will improve the service facilities for the western trade. This plant will be under the direction of C. E. Heise, San Francisco district manager.

Mountain States Power Company Increases Coos Bay Plant

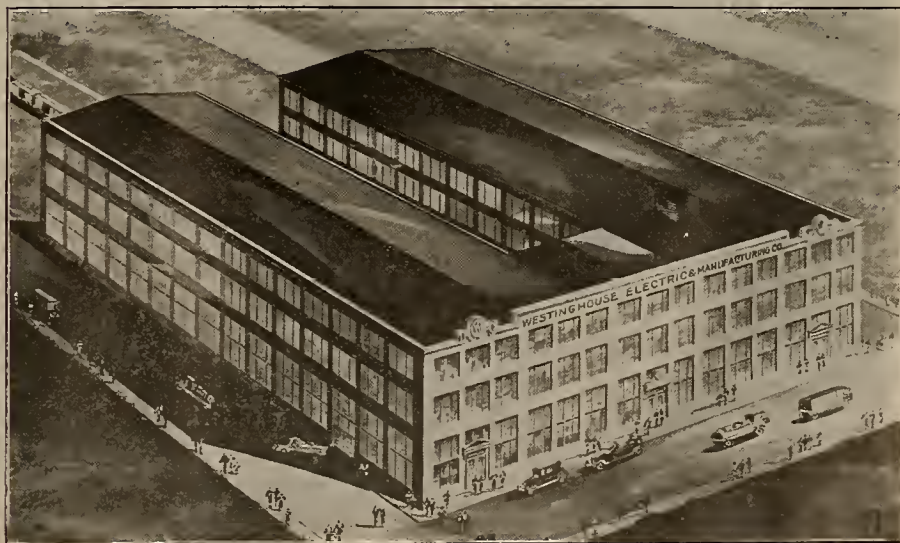
The Mountain States Power Company is to increase its power plant at Coos Bay, Ore. The expansion involves a new electric plant which is to be built in North Bend on property to be purchased from the Stout Lumber Company. The cost of this plant will be between \$600,000 and \$750,000. Besides the plant, which is to be of concrete and piled high enough to avoid trouble from high tides, the company will install hogs at several mills for grinding refuse lumber, and construct several barges for transportation of fuel when urgency requires.

The new plant will run in connection with the present plant situated on the property of the Coos Bay Lumber Company in Marshfield and will have a generating capacity of 5,000 kw. Both plants will operate continuously, but either will have sufficient power to handle the company's load if one breaks down. The 11,000 kw. available at the Coos Bay Lumber Company plant was found inadequate to supply the mills there. The Mountain States Power Company has been obliged to install, in addition to 900 service connections this year, 2,500 hp. in units to be used for manufacturing industries. This plant and the one constructed at the Coos Bay Lumber Company grounds during 1923 make an investment of nearly \$1,000,000 for the Mountain States Power Company in two years.

Newspaper Comments on Safe and Sane Christmas This Year

Due to electricity, says a San Diego newspaper, that city had a "safe and sane" Christmas this year. The "safe and sane" was transferred from its usual Fourth of July associations because firemen of San Diego attributed the entire absence of Christmas tree fires this year to the more general use of electric lights on Christmas trees, replacing the old-time candles.

Each Christmas previously, the firemen stated, there had been two or more fires started from candles on Christmas trees igniting nearby draperies and causing sometimes serious conflagrations. This year the firemen stayed at the stations and enjoyed a real holiday because of the use of electric tree lights.



Architect's drawing of new Emeryville plant of Westinghouse Electric & Manufacturing Company.

Municipal Ownership Advocates Meet in Seattle

Conference Places Stamp of Approval on Bone Bill, Condemns Reed Measure and Appoints Committee on Erickson Act

Discussion of the form which the state ownership bill which will be presented to the voters of Washington next November will take, was the chief topic of discussion at a meeting of 75 municipal ownership advocates held in Seattle Dec. 20, 1923. Emerson Cross, city attorney of Aberdeen, which has recently voted \$2,000,000 in bonds for a municipal hydroelectric plant, presided at the meeting.

The conference adopted a resolution condemning the Reed bill, the referred measure which calls for a 5 per cent gross tax upon all power sold by municipal plants outside the corporate limits of the cities owning the plants and endorsed the Bone bill, a proposed initiative measure which will give cities the right to sell power outside their corporate limits.

The conference also passed a resolution endorsing the Super Power League which is fostering the so-called Erickson bill. This resolution also endorsed the measure which has been prepared by T. J. L. Kennedy, corporation counsel for the Seattle Light Department, authorizing cities to condemn telephone systems after existing franchises expired.

A special committee with J. D. Ross, superintendent of the Seattle Light Department, as chairman, made an extended study of the Erickson bill and reported favorably on the measure after making a few minor amendments.

The Erickson measure provides for the creation of power districts similar to the organization of port districts. These districts can include one or more counties, or only municipalities. Each district has three salaried commissioners, the salaries ranging according to population from \$500 a month downward. The districts are authorized to

make a mileage levy, issue bonds and acquire hydroelectric power sites or transmission and distributing lines.

Amendments to the bill recommended by the committee provide for units smaller than the county for public power development districts, and exempt municipally owned plants from condemnation under the sections of the bill which provide for a state-wide public power development. These amendments, Councilman Oliver T. Erickson, author of the bill, states do not affect the principle on which the measure is based. The provision exempting the present municipal plants from condemnation under the proposed bill was adopted as a result of charges that the state-wide power plant was an attempt of Seattle to unload the Skagit development.

It is generally expected that the action of the special committee will be endorsed at the general conference to be held later.

World's Highest Head Reaction Type Turbine Completed

The world's highest reaction type turbine has just been completed by the Pelton Water Wheel Company of San Francisco and shipped to the Oak Grove plant of the Portland Railway, Light & Power Company. The accompanying illustration shows the assembled unit just before being shipped from San Francisco.

The turbine will operate under an effective head of 860 ft., at 514 r.p.m., driving a direct connected 25,000-kva. vertical generator. Installation work will start during the present month.

Several interesting features have been incorporated in the design of the new turbine. This is the first turbine

to have the butterfly valve mounted directly on the turbine casing. In addition to the 72-in. butterfly valve a Johnson valve will be installed at the upper end of the penstock. Other features embodied in the turbine are: rubber seal rings, Moody type draft tube, disk type guide vanes and the Taylor forced feed lubrication system. This turbine has the same type of governor control as that used on the Moccasin Creek units for the City of San Francisco which enables the operator to throw the unit over from automatic to hand control, on a moment's notice.

The Oak Grove plant of the Portland Railway, Light & Power Company is to be placed in operation during July of this year. The development consists essentially of a 60-ft. concrete diversion dam on the Oak Grove Fork of the Clackamas River; a 6½-mile steel pipe flow line 9 ft. in diameter; a surge chamber with hour-glass section; a 1,360-ft. penstock with a top diameter of 8 ft. and a bottom diameter of 6 ft., and a power house with an ultimate capacity for three units, the first installation being one 25,000-kva. generator. Power will be transmitted to the City of Portland over a 60,000-volt, 70-mile steel tower transmission line. The initial unit will cost in excess of three million dollars and the ultimate development of 75,000 kva. will cost ten million dollars.

General Electric Company Opens KGO Broadcasting Station

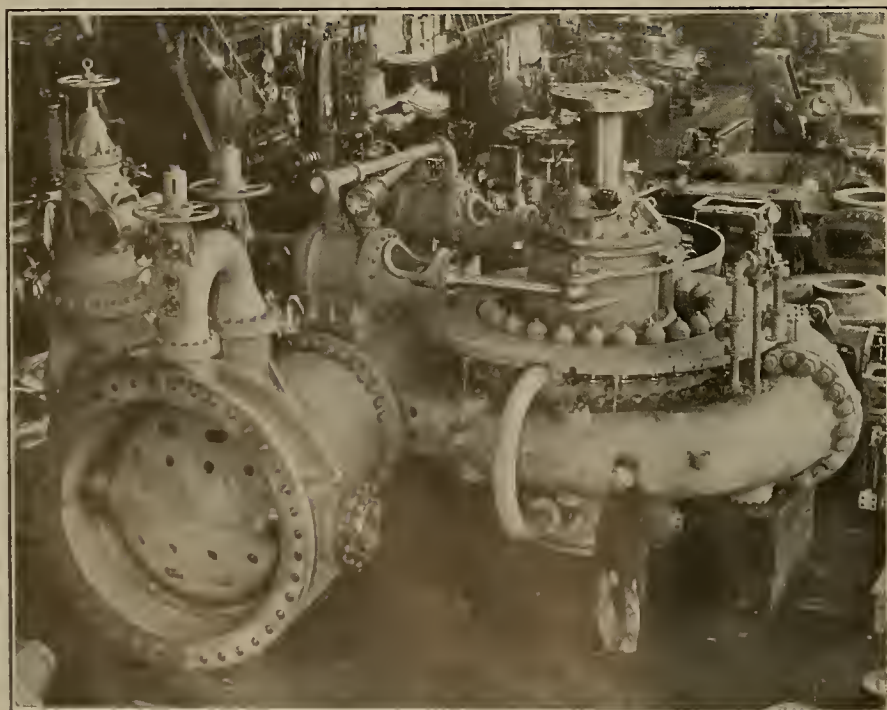
With song, speech and other appropriate ceremony the General Electric Company's new radio broadcasting station KGO, in Oakland, Calif., was officially opened on the evening of Jan. 8, 1924. This station, which is at present using 1,000 watts, is capable of sending at twice that force and is expected to be heard from 6,000 to 9,000 miles away, the distance, of course, varying with atmospheric conditions. The station is provided with a system of remote controls by means of which music and entertainment may be picked up from theaters and halls in Oakland and other nearby cities and broadcast.

Steel towers 150 ft. high support the antenna and under the antenna, but about 14 ft. above the ground, is a network of wires covering an area of approximately 150 ft. by 300 ft. The power house is also beneath the antenna system and contains six large motor-generators and other equipment.

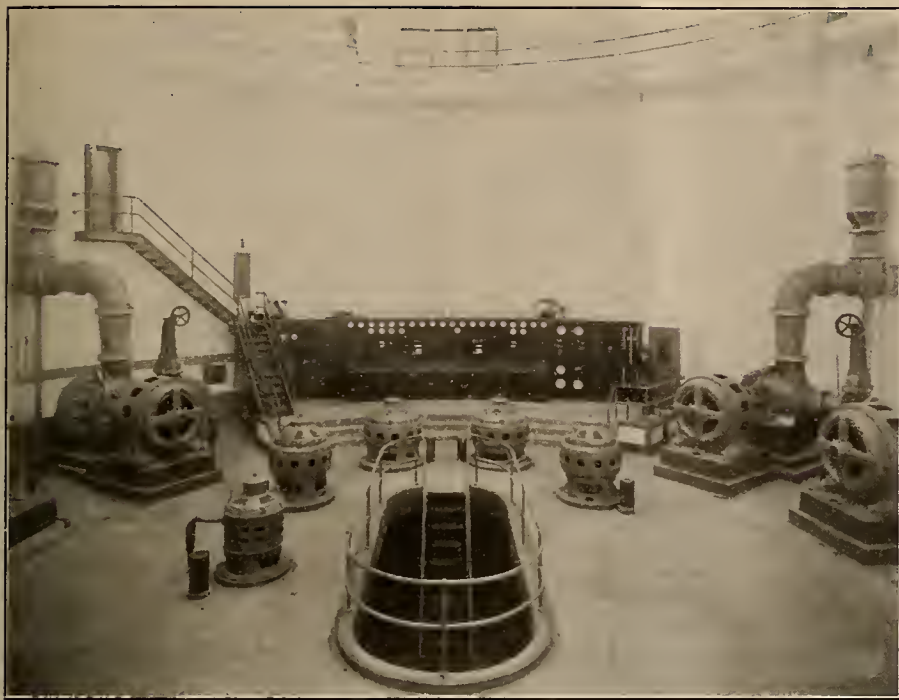
KGO will broadcast on Tuesday, Thursday and Saturday evenings from eight to ten o'clock, operating on 312 meters in order not to interfere with other stations. This is claimed to be the largest radio broadcasting station in the world.

Agitation for City Ownership Started in Walla Walla, Wash.

Agitation has been started in Walla Walla, Wash., for the construction of a municipal light plant. Estimates have been prepared indicating that the city can construct a plant for approximately \$750,000 and plans are being discussed for a bond issue for that amount. Failure of the public service company serving the city to reduce rates is advanced as the reason for the entrance of the city into the light and power business.



Shop view of the world's highest head reaction turbine built by the Pelton Water Wheel Company for the Portland Railway, Light & Power Company, Oak Grove plant.



Interior of new filtration plant at Sacramento, Calif.

California Filtration Plant Power Equipment

The new filtration plant which will supply clear water to the people of Sacramento, Calif., is served with hydro-electric power by both the Pacific Gas and Electric Company and the Great Western Power Company, and is so designed that each company may serve only half the plant or, if desirable, may assume the whole load. If one supply should fail suddenly, the other supply automatically receives the load.

The power is supplied at 11,000 volts through two underground cables in two separate ducts terminating in the high tension bus and switching structure of the plant. Six 500-kva. transformers have been installed in the plant with provision for additional space for future needs. After being stripped down from 11,000 to 2,200 volts, the power enters the secondary bus structure.

On the primary bus structure are mounted the switching devices, the 15,000-volt, 600-amp. "B-2" oil circuit breakers, which are electrically operated from remote control and handle the incoming power circuit, and the main feeder circuit from each bank of transformers; also the smaller "F-2" oil circuit breakers of 7,500-volt, 300 or 500-amp. capacity likewise electrically operated from remote control, which handle the starting and running of each individual motor.

The secondary bus structure carries all the type "CO" relays, current transformers, solenoids and type "S" disconnecting switches necessary for the protection and operation of the plant. Either structure can be operated as a unit or separated into two distinct structures, each section of which can be operated by hand or automatically by electricity.

The electric motors on the main floor of the station are all Westinghouse squirrel cage induction type. The high lift pumps are driven by three 900-hp. motors at 870 r.p.m. and two 700-hp.

motors at 1,170 r.p.m.; the low lift pumps are driven by vertical motors, two of 275 hp. each, two of 175 hp. and one of 125 hp. The drain and wash water pumps are driven by four motors of 300 hp. total capacity.

Tacoma Advertises Bond Sale for Lake Cushman Project

Bids for the purchase of the \$4,000,000 of Tacoma light utility bonds, authorized by the city council to construct the first unit of the Lake Cushman power project, will be received by the city council Jan. 21, 1924. The bidders are requested to state at what interest rate they will take the bonds at par. The city cannot pay in excess of 6 per cent, and it is believed that a considerably lower rate will be obtained. City light bonds have sold at 5 per cent interest in the past. The successful bidders will have 20 days in which to obtain legal opinion on the validity of the bonds, and 10 days further to perfect the purchase.

A resolution by the council is expected to pass authorizing a call for bids upon the construction of the dam and appurtenances without awaiting the outcome of the bond sale, in order to save construction time.

Seattle Grants Time Extension to Skagit Contractors

The Seattle city council, upon advice of Chief Engineer C. F. Uhden of the Skagit project, and City Engineer J. D. Blackwell, has granted one month's extension of time to the firm of R. C. Storrie & Company, who have the contract to complete the tunnel at the Skagit hydroelectric plant. Under the new extension, which is the second one granted since the contract expired, the time limit expired Dec. 22, 1923, and the Board of Public Works is now considering whether a penalty shall be imposed on the contractors. Forest fires, bad weather and several minor strikes have delayed the work.

Property Valuation Fixed for Idaho Power Company

The Public Utilities Commission of the State of Idaho has placed a valuation upon the properties of the Idaho Power Company, as of June 30, 1923, of \$16,182,380.87, a reduction of over \$800,000 from the figure claimed by the company.

The rate of return on the company's investment was fixed at 7½ per cent on \$14,640,284.98 of the valuation and at 5 per cent on the remainder, with an allowance for retirement reserve, maintenance, operation and taxes for the year ended Dec. 31, 1922, of \$1,349,172, and for the year ended July 31, 1923, of \$1,394,534. The increase was allowed because of the company's augmented taxes in Oregon this year.

These figures give an annual revenue of \$2,569,660.16. The company has been contending that it needed at least \$2,800,000, while the Southern Idaho Power Users' Association, which has been fighting to keep down the valuation of the company's property, has claimed that it should not be allowed more than \$2,358,000.

The rate of return on property used especially for irrigation purposes has been fixed at 5 per cent in excess of the winter peak load. The question has been before the commission since 1919, without decision.

The commission allowed \$726,275 for working capital, made up, among other things, of delinquent accounts, or an increase of more than \$26,000 over the allowance as of Dec. 31, 1919, to cover increased delinquencies, principally irrigation accounts.

The rates in force throughout the territory served by the company were decreed discriminatory, and it was ordered that new rates, rules and regulations in conformity with the findings of the commission be filed within thirty days. The commission also ruled that the reduction in rates to irrigation consumers should be retroactive and that a rebate of \$3.28012 per horsepower of demand be made upon bills for this service during the 1923 service.

Meeting Held by Women's Public Information Committee

The Women's Public Information Committee of the Pacific Coast Division of the National Electric Light Association held its first meeting of the year in San Francisco, Calif., on Dec. 29, 1923. Miss J. Frances Eman, of the Southern California Edison Company, Los Angeles, Calif., is chairman and presided. The meeting was called to consider the various phases of public utility information and publicity that are of interest to women and to discuss ways and means of promoting a greater knowledge and better understanding of public utilities by the feminine consumer and stockholder. The meeting was attended by the following: Miss M. Hinricks, of the Coast Valleys Gas & Electric Company, Salinas, Calif.; Mrs. M. Stevens, of the California Telephone & Light Company, Santa Rosa, Calif.; Miss Bertha J. Dale, of the Pacific Gas and Electric Company, San Francisco, Calif.; Miss Mabel Wick, representing the Tucson Light & Power Company, Tucson, Ariz., and Miss Clotilde Grunsky of the McGraw-Hill Company.

Pacific States Company Announces 1924 Program

Newspaper and Billboard Advertising to Be Used in Over One Hundred Cities and Towns in Western States

That the "Check" Seal campaign has been successful, that it has been a constructive force in behalf of better electrical contracting and that it has been of definite benefit to the electrical industry and the general public was the message given to members of the electrical industry at San Francisco by executives of the Pacific States Electric Company at a meeting in the Palace Hotel, Jan. 9, 1924. The meeting was one of a series which is being held in cities of California, Oregon and Washington to explain the details of the company's 1924 advertising campaign. Over 450 members of the industry attended the San Francisco meeting while 160 attended a similar meeting in Oakland the previous evening.

F. C. Todd, manager of the San Francisco district of the company, presided over the meeting. The first speaker was T. E. Bibbins, president of the company, who traced the history of the "Check" Seal movement and described some of the results obtained. He was followed by R. E. Fisher, vice-president in charge of public relations and sales of the Pacific Gas and Electric Company, who spoke on "Responsibilities of the Contractor and Retailer to the Public."

"Credits and Capital in Business" was the title of a paper presented by Charles Goodwin, assistant treasurer of the Pacific States Electric Company. Mr. Goodwin outlined some of the dealer's responsibilities to the credit man.

J. D. Barnhill, president of Evans & Barnhill, advertising counselors to the Pacific States Electric Company, outlined some of the business possibilities of the electrical industry on the Pacific Coast. Mr. Barnhill pointed out that with a normal construction rate of 21,000 buildings monthly for the three Pacific Coast states, 1920 was 68 per cent of normal, 1921, 90 per cent of normal, 1922 5 per cent above normal and 1923 25 per cent above normal. He stated that economists estimate that it will require at least five years of above normal construction to make up for the shortage which accrued during the World War. He brought out that in 1921 the average number of electrical outlets per building was 11.5, that in 1923 this average had been increased to 16.2 outlets and that the Pacific States Electric Company has set 25

outlets as the minimum to be reached. He estimated the present lamp business of the Pacific Coast states as 16.5 millions annually and showed methods that might be adopted to bring this business up to a total of 29 millions.

D. E. Harris, vice-president of the Pacific States Electric Company, described the campaign which will be followed out during 1924. According to Mr. Harris, newspaper advertising will be carried in the papers of 109 cities and towns, the papers having a combined circulation of 1,527,420. Advertising will also appear in the Sunset Magazine, the California Alumni Monthly and the Journal of Electricity. A total of 700 billboards will be used in 107 cities and towns during the year. All cities of over 2,500 population in California, Oregon, Washington, Idaho, Nevada and Arizona will be covered by both newspaper and billboard advertising. An idea of the growth of the campaign can be gained when it is noted that billboards were used in but 30 cities and towns during 1923 and advertising appeared in but 25 newspapers. Mr. Harris also stated that new job signs had been prepared for contractors and that plans had been perfected to have contractors' and dealers' advertising handled through the firm of Evans & Barnhill, should this service be desired. A new edition of "The Electrical 'How' for Housekeepers," a consumer booklet, has also been prepared for distribution.

The advertising plans of the merchandising department of the General Electric Company were described by R. E. Alvord of the San Francisco office of the company, who stated that his company would use 51 national magazines during the year, as well as local newspapers and billboards.

Other speakers during the evening were Thomas L. Emory, head of the Advertising Bureau of the American Newspaper Publishers' Association, and Charles Duncan of the firm of Foster & Kleiser.

Similar meetings to the one held in San Francisco will be held in Los Angeles, San Diego, San Jose, Bakersfield, Fresno, Stockton, Sacramento and other California cities. Present plans also call for meetings in Portland, Jan. 25, 1924, Seattle, Jan. 29, 1924, and Spokane, Feb. 4, 1924.

Puget Sound Company Announces \$5,000,000 Program

Approximately \$5,000,000 will be expended in western Washington this year by the Puget Sound Power & Light Company, of Seattle, in carrying out an improvement and expansion program, according to an official announcement made by President A. W. Leonard on Jan. 3.

In addition, he announced, preliminary work will be done on the company's Baker River project, the ultimate development of which, it is conservatively estimated, will call for an investment of many millions of dollars.

The 1924 program as announced includes:

Immediate construction of an additional unit of the White River power plant at a cost of more than \$1,000,000, the unit to produce 23,000 hp.

Expenditure of \$2,500,000 in building new transmission and distributing lines and making substation improvements.

Expenditure of \$1,000,000 in making permanent miscellaneous improvements to other utility properties such as railways, water and gas systems.

Detailed announcement of the company's plans follows the brief announcement made by President Leonard upon his return from the East last November that several million dollars would be expended in increasing production facilities and in improving and extending service.

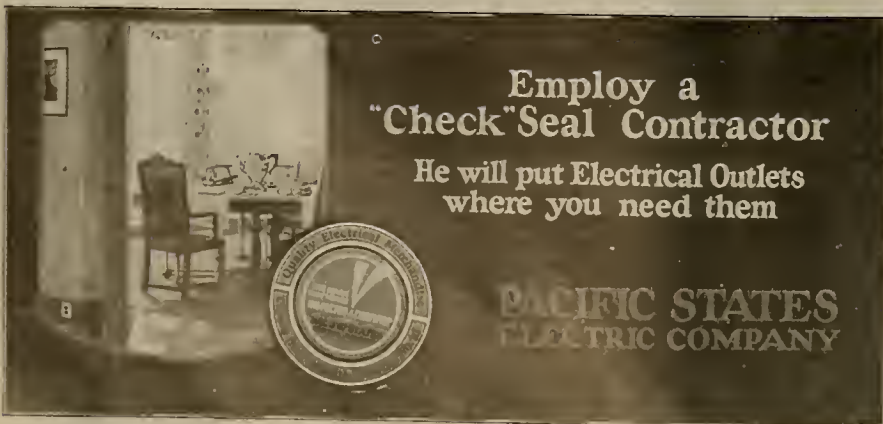
The Baker River project is in Whatcom County, near Concrete, in the Cascade Mountains, near the Canadian boundary line. The preliminary work to be done this year will bring the project to a point where extensive and rapid development at a reasonable cost will be possible.

Several years ago the company obtained two sites on the Baker River in preference to the rights it then held on the Skagit River, which were surrendered on the theory that development costs would be higher than on the Baker. The Skagit rights were subsequently acquired by the City of Seattle and are now being developed.

The White River power plant is the largest now owned and operated by the company. The first unit was built in 1912, with a capacity of 26,700 hp. Additional units constructed in 1918 increased the capacity to 61,660 hp. The unit now to be added will bring the capacity to 94,660 hp. This new unit will be in service by October or November next. The program calls for the enlargement of the present big building, construction of another penstock and the installation of more machinery. The company's reserve water supply in Lake Tapps is more than ample, it is stated, to operate the new unit.

The Simplex Electric Heating Company, Cambridge, Mass., report that they have received large orders for Sunbowl electric heaters for shipment to Japan. These heaters will be used to replace the charcoal burners which have been in use for so long in that country.

The Plains Light & Water Company, Plains, Mont., has announced rate reductions in its lighting schedules. These reductions are now in effect and are the result of the cooperation of the utility company, the mayor of the town and the town council.



Employ a
"Check" Seal Contractor
He will put Electrical Outlets
where you need them

PACIFIC STATES
ELECTRIC COMPANY

Billboards similar to this will be used in over one hundred western cities.

Edison Company Orders Largest Synchronous Condensers

The Southern California Edison Company has recently placed an order with the Westinghouse Electric & Manufacturing Company for three 30,000-kva. synchronous condensers with direct-connected exciters and nine 11,661-kva. step-down transformers with starting taps for the synchronous condensers. The condensers will have a maximum capacity of 35,000 kva. and will be the largest in the United States.

One of the synchronous condensers and three of the transformers will be installed in the Eagle Rock substation of the Edison company and the other two condensers and six transformers will go in the Laguna Bell substation. This equipment is similar to apparatus already installed and will facilitate extension of the company's system. The apparatus is designed to lighten the load on the company's transmission lines.

Municipal Power Plant Project Contemplated by Nampa

With a view toward reducing the cost of electricity in Nampa, Idaho, that city is investigating the feasibility of establishing a municipal power plant. A tentative plan contemplates tapping the Snake River near Nampa. Between this point and the proposed plant site is an estimated drop of 18 ft., which would necessitate the construction of a ditch approximately nine miles long to bring water from the Snake River to a point on the rimrock near the contemplated site, an admittedly expensive but feasible piece of work.

At the point of delivery there would be an excess of power, but it is believed that this could be sold for irrigation purposes or disposed of to adjacent communities in the market for power.

Plans for New Hydro Plant Are Announced by Puget Sound Co.

Plans for the construction of a \$600,000 hydroelectric power plant on the Sultan River, a tributary of the Snohomish River, by the Puget Sound Power & Light Company, will be completed in the near future, in connection with the company's general scheme for power development in the state, W. H. McGrath, vice-president of the company, recently stated. Application for water appropriation on the Sultan River has been filed with State Supervisor of Hydraulics by the power company, through its president, A. W. Leonard. Tentative plans provide for a timber crib diversion dam, 15 ft. high and 200 ft. long, with a canal 1.6 miles long, and the power plant will have a working head of 100 ft. with a 4,000-kw. unit.

Electric Home Exhibition to Be Held in Boulder, Colo.

Another electric home exhibition is scheduled for the Rocky Mountain region at Boulder, Colo., the second one in that city and the seventh to be featured in Colorado during the past two years. Arrangements have been made by E. S. Henderson, Boulder manager of the Public Service Company of Colorado, with a prominent Boulder building company to feature the first of a number of new homes close to the Univer-

sity of Colorado as an "all-electric" bungalow. Every contractor-dealer in the city has been invited to participate in the project and the assistance of several furniture houses has been offered in furnishing the interior. It is understood that these furnishing firms have interested themselves in a number of pieces of wired-furniture which will be displayed in Colorado for the first time.

Mr. Henderson is out to establish a new attendance record when the home is opened late in January. At the first home, which he built for himself, the attendance represented 40 per cent of the population of the city.

New Electrical Jobbing Firm Opens in Denver, Colo.

The latest firm to take its place in the ranks of Denver, Colo., jobbers is the Elliott-Schmidt Electric Supply Company, recently organized by two well known electrical men in that city. The sponsors of the new company are Roy W. Elliott, who resigned his position as sales manager and purchasing agent of the Albert Sechrist Manufacturing Company after 18 years of service, and K. B. Schmidt, a prominent manufacturers' agent.

Although regular supplies will be handled, it is understood that the new firm will concentrate on the distribution of those specialties previously featured by Mr. Schmidt. Among the accounts announced are those of the Mutual Lamp Manufacturing Company; Sunset Lighting Fixture Company; Hamilton-Ross Shade Company; M. Propp & Company; Northern Electric Company; Frank E. Walcott Manufacturing Company; United Metal Spinning Company; Standard Metal Spinning Company; and the Incandescent Supply Company.

A location has been obtained at 217 Fifteenth St., in the center of a number of contractor-dealer establishments. The new business opened Jan. 2, 1924.

Stone & Webster Building New Cle Elum Substation

Construction has started by the engineering forces of the Stone and Webster corporation on a \$160,000 substation at South Cle Elum, Wash., for the Puget Sound Power & Light Company. The improvement will handle the mining and irrigation power loads in the Kittitas valley. The substation will be a 5,000-kw. station, outdoor type, covering an area of about 200 sq. ft. It will be of concrete construction and when completed will be tied in with the system of the Chicago, Milwaukee & St. Paul Railway. Plans for the project and all engineering details were worked out by the engineering department of Stone and Webster under the direction of S. L. Shuffleton, western manager.

The Appliance Sales Committee of the Pacific Coast Electrical Association held a meeting at the Jonathan Club, Los Angeles, Calif., on Jan. 11. At this meeting was discussed the matter of arrangements for the meeting at Del Monte on Jan. 25 and 26 and it was decided to give special attention to the matter of successful retailing of electrical appliances. There will be another meeting of the committee in Los Angeles on Jan. 18, at which time all final arrangements for presentation of papers at Del Monte will be made.

Northwest Lumber Firm Orders Heavy Electrical Equipment

Ten five-ton electric cranes, one of ten-ton capacity, five lumber trolleys, equipped with Sumner type grapples, eleven two-way switches and 6,000 ft. of track have been ordered by the Long-Bell Lumber Company from the Pawling & Harnischfeger Company of Milwaukee, Wis. Twenty freight cars will be required to transport the machinery to Longview, Wash., the home of the Long-Bell Lumber Company.

Break in Big Creek 8 Penstock Results in Two Deaths

Two lives were lost in the unfortunate breaking of the penstock on Jan. 1, 1924, at the Big Creek No. 8 plant of the Southern California Edison Company at the junction of Big Creek and the San Joaquin River. The accident occurred when the plant was being shut down. The break was in the pipe near the head of the penstock. The two women who lost their lives were members of the families of Edison employees. The cause of the break has not been determined.

Salt Lake Electrical Jobber to Discontinue Auto Supplies

The Capital Electric Company of Salt Lake City has sold out its entire automotive accessory stock, excepting Gould batteries, Tungar battery chargers and Edison miniature Mazda lamps, to the Covey-Ballard Wholesale Company of that city.

The business of the Capital Electric Company will henceforth be exclusively that of wholesaling of electrical supplies. A growing volume of business and consequent need of greater store-room facilities for the company's major line, are the reasons for the change.

Three railroad companies serving the Pacific Northwest, the Chicago, Burlington & Quincy, the Great Northern and the Northern Pacific, have recently published a small booklet entitled, "Power for Supremacy." The booklet deals with the potential and developed power sites in the Pacific Northwest. The publication is well illustrated with pictures of power projects and the text is devoted to the telling of the story of power development in the territory.

Contract for furnishing steel towers for the transmission line from the Moccasin Creek Power House of the City of San Francisco to the city's substation site has been awarded to the Pacific Coast Steel Company. The towers will be so designed that the power lines will be separated by a gap of 30 ft. The contract sets the cost of the towers at \$437,944. Work of erecting the towers will be started within a few weeks.

The Puget Sound Power & Light Company, Everett, Wash., recently completed construction of a power line to serve the Silver Lake and Marysville districts, in Washington, supplying power to 1,000 homes. Power was turned on Dec. 22, 1923.

A contract has been let to the Western Electric Company to rewire the Anaconda, Mont., city hall. The amount of the contract is \$1,497.50 and the work will start at once.

Meetings

Denver Meeting Discusses Service and Public Relations

Convincing evidence of ever-increasing interest in public relations work on the part of utility company executives was provided by the first annual Mid-winter meeting of utility representatives, in Denver, Dec. 18, 1923. Almost 100 Colorado, Wyoming and New Mexico operators attended the conference, held under the auspices of the Rocky Mountain Committee on Public Utility Information and the Rocky Mountain Division of the National Electric Light Association.

While various other subjects provided material for a number of addresses and discussions, the dominating theme of the convention was public relations—the most effective methods of imparting public understanding of the utility business. Every company which has systematically undertaken work along this line, and which was represented at the meeting, reported splendid progress.

It was agreed during the convention that there is no other phase of the public utility business which is more important than establishing public understanding. It was pointed out by a half dozen of the principal speakers that, as the people grow to understand the problems involved in providing them with satisfactory electric, gas, telephone and street railway service, it is becoming easier to furnish that service. Service, too, is becoming better.

In undertaking the gigantic task of informing the people of vital matters concerning the utility industry, the utility men themselves have reaped great benefits. In order to properly inform the people, the utility men have necessarily had to inform themselves, often on matters they believed they thoroughly understood, but of which, it developed, they had but slight knowledge.

W. C. Sterne of Denver, chairman of the Rocky Mountain Committee, and Norman Read, general manager of the Colorado Power Company, also of Denver, presided during the series of meetings which occupied a full day's time.

Ben S. Reed, president of the Mountain States Telephone & Telegraph Company; Ernest C. Stenger, receiver for the Denver Tramway Company, and Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, were hosts to the visiting utility men.

Los Angeles Electric Club Will Have Annual Banquet

The Electric Club of Los Angeles will hold its annual banquet at the Biltmore Hotel on Saturday evening, Feb. 2, 1924, when an elaborate dinner and dance will be held. Some 400 or 500 members of the Electric Club and their wives, together with representatives of the electrical industry from San Francisco and San Diego, are expected to attend.

Special invitations have been sent to the San Francisco and San Diego Electric Clubs and a large gathering from each of these cities is expected.

The new electric home at Hollywood, which will be in progress of construction at that time, under the auspices of the California Electrical Cooperative Campaign, will be brought prominently to the attention of the visitors on this occasion and will tie in with the annual banquet.

President R. E. Smith of the Electric Club, under whose guidance the club has had a most successful year, during which time many interesting and entertaining features have been produced, hopes to have this the banner event of the year and has appointed the following committee of arrangements: Elbert Kramer, general chairman; J. G. Loomer, arrangements; J. C. Pyle, entertainment; C. H. Paulin, tickets; J. E. MacDonald, program, and K. E. Van Kuran, reception.

Railway Electrification Discussed by Denver Engineers

Electrification of railroads was discussed at the Christmas meeting of the Denver section, American Institute of Electrical Engineers, held on Dec. 21. The symposium was led by Herbert B. Dwight, engineer of the Colorado Public Utilities Commission. The principal speakers were F. C. Hanker of Pittsburgh, general engineer of the Westinghouse Electric & Manufacturing Company, who spoke on "Recent Developments and Future Possibilities of Railway Electrification"; H. B. Barnes, Denver consulting engineer, with a paper on the historical development of the subject; and H. D. Randall, district manager of the General Electric Company, who presented the economic side.

Idaho Chapter of A.A.E. to Meet at Pocatello

Engineers from all sections of Idaho and from several neighboring states will be in attendance at the annual convention of the Idaho Chapter of the American Association of Engineers at Pocatello, Jan. 21 and 22, 1924. The two days will be devoted to the presentation of papers on technical and popular subjects, the discussion of the Association's affairs, and visits of inspection to engineering projects in Pocatello and vicinity.

The Idaho Power Company has extended an invitation to those in attendance at the convention to visit its new hydroelectric development at American Falls which involves many new and original features, and also to inspect its new substation at Pocatello which is now under construction. Besides these, many other recent developments in Pocatello and vicinity will be visited.

One of the principal speakers will be Ralf R. Woolley, hydraulic engineer of the United States Geological Survey. Mr. Woolley will give an illustrated talk on "Boating through the rapids and canyon gorges along Green River to study irrigation and power possibilities of the river."

The American Association of Engineers embraces all branches of the engineering profession in its membership, and the program committee has prepared a program which will cover all parts of the field.

Contractor-Dealers in San Diego Celebrate Christmas

The Electrical Contractors' Association of San Diego celebrated Christmas by a banquet and entertainment, December 21, at the San Diego Hotel, with their wives and daughters as honor guests of the occasion. It was a Christmas party in the full sense of the word, with a Christmas tree, holly decorations, a Santa Claus and everything.

A large Christmas tree stood in the center of the hall lighted by hundreds of colored electric lights. The walls and tables were decorated in holly.

William Boyce was the toastmaster of the evening. Otto Jeancon rendered a vocal solo, accompanied by Mrs. F. Gronberg. Mrs. C. C. Caldwell and George Brown gave readings. The entire group joined in singing community songs.

Thomas Smith was the Santa Claus of the affair, distributing the gifts on the tree. Gifts included rifles and shotguns, diamond earrings, ivory inlaid accordeons; gold bracelets, pearl necklaces, violins, bagpipes, and gold-mounted cigarette holders.

Games were played and the evening ended with a dance in the hotel ballroom.

Rocky Mountain Cooperative League Holds Election

H. M. Ferguson, manager of the Salt Lake division of the Utah Power & Light Company, was elected chairman of the advisory committee of the Rocky Mountain Electrical Cooperative League at the annual election on Dec. 13. C. B. Hawley, manager of the Intermountain Electric Company, was elected vice-chairman, and R. M. Bleak, superintendent of lighting and appliance sales of the Utah Power & Light Company, was re-elected secretary and treasurer.

The following were elected members of the committee (all of Salt Lake City, Utah):

Contractor-Dealers

- G. W. Forsberg, manager Wasatch Electric Company
- F. C. Wolters, manager Modern Electric Company
- E. H. Eardley, manager Eardley Electric Company
- G. R. Randall, manager Salt Lake Electric Supply Company

Central Stations

- H. M. Ferguson, division manager, Utah Power & Light Company
- R. M. Bleak, superintendent, lighting and appliance sales, Utah Power & Light Company
- D. C. Green, vice-president and general manager, Utah Power & Light Company
- P. M. Parry, commercial manager, Utah Power & Light Company

Jobbers

- C. B. Hawley, Intermountain Electric Company
- A. J. Callaway, Western Electric Company
- J. A. Kahn, Capital Electric Company
- J. D. Nicholson, Mine & Smelter Supply Company

Manufacturers

- Robert Miller, General Electric Company
- W. A. Moser, Westinghouse Electric & Manufacturing Company
- B. E. Rowley, Edison Electric Appliance Company
- S. S. Stevens, Stevens Sales Company

The Advisory Committee of the California Electrical Cooperative Campaign will meet in Los Angeles, Feb. 1, 1924, the day before the annual banquet of the Los Angeles Electric Club. One of the topics of discussion will be the Hollywood Electric Home which will be opened to the public Feb. 14, 1924.

Manufacturer, Dealer and Jobber Activities

The Baker-Joslyn Company, San Francisco, Calif., has recently been appointed exclusive distributor for the products of the California Wire Company in northern California and in the Pacific Northwest. The new representation became effective Jan. 1. Up to the present time, the California Wire Company has been maintaining a factory representative and warehouse stock at 431 Bryant Street, San Francisco. This office has been closed on account of the appointment of the jobbing house as distributor in the territory.

The National Metal Moulding Company, Pittsburgh, Pa., has announced a new line of sherardized conduit boxes and covers which will be in stock in San Francisco, Calif., on Jan. 1, 1924. Garnett Young & Company are the exclusive distributors for the company and will handle the business in these lines for the Pacific Coast states.

The White Lily Manufacturing Company, Davenport, Iowa, has brought out a new model washing machine which is claimed to be oilless and noiseless. The machine is of eight-sheet capacity and is furnished in either galvanized or copper.

The Standard Electric Stove Company will open its new factory at Goshen, Ind., early in 1924. The new factory will be 1,000 ft. long and 80 ft. wide and will have greatly increased capacity over the present plant at Toledo, Ohio.

The Edison Electric Appliance Company, Chicago, Ill., has announced the offering of a new table stove for immediate delivery. The new device is 6 in. square, is nickel finished with fibre feet, and is of 660-watts capacity.

The General Electric Company has developed a strongly braced cylindrical type of insulated choke coil for lightning arresters, consisting of a coil of bare copper wire, securely braced for the full coil length at three points around the circumference. The coil is mounted on insulators which are supported on a channel iron. The indoor coils have standard General Electric busbar insulators and the outdoor type are equipped with General Electric standard pin type insulators.

The Beaver Machine Tool Company, Newark, N. J., is conducting an intensive sales campaign on its triple-duty line of sockets. This socket permits of the use of three devices on one socket at one time.

Nicholas M. DuChemin has assumed the duties of general superintendent of the West Lynn, Mass., plant of the General Electric Company following the death of William J. Lloyd.

The International Commercial Company, with offices in the Mills Building, El Paso, Texas, has been organized by R. W. Richards, K. V. DeLacy and C. J. DeWeese. The International Commercial Company will act as manufacturers' representatives, covering a complete line of electrical supplies and radio equipment in the territory embracing west Texas, New Mexico, Arizona and Mexico.

The Ward Leonard Electric Company, Mount Vernon, N. Y., has developed a Vitrohm resistor unit with Ediswan (bayonet lock) base, for use where vibration and jars are likely to loosen the resistor from a standard screw socket. This unit is made for reducing regular line voltage to meet the requirements of so-called "low-voltage" devices, motor-generator sets, etc.

The Elwell-Parker Electric Company, Cleveland, Ohio, has recently placed on the market a new electric industrial truck known as the Hi-Lo Tractor. The new type truck will pick up or deposit a load at any point up to six feet above the floor. The truck will handle a load of 6,000 lb.



Harry Garbutt, of the Westinghouse Electric & Manufacturing Company, San Francisco, had some difficulty in getting his club right end up but he will follow through in approved fashion.

The F. W. Wakefield Brass Company of Vermilion, Ohio, has developed a combination kitchen unit to provide a convenience outlet in kitchens where the only electrical connection is through a single ceiling fixture. The convenience outlet consists of a short channel or trough leading from the fixture canopy close to the ceiling and carrying an ordinary drop cord connected in accordance with Underwriters' rules. The trough is of proper length to give clearance on glassware up to 14-in. diameter.

The Mitchell Vance Company, Inc., New York, N. Y., has recently added to its line of lighting fixtures an enclosed dust proof kitchen lighting fixture designated as Type X.C.K. The unit is designed for use with 150-watt lamps but may be lighted with a 100-watt lamp with equal efficiency. It is furnished either with or without self-contained pull chain switch.

The Crocker-Wheeler Company has recently moved its San Francisco office from 604 Atlas Building to room 907 of the same building. Arthur Purdon, manager of the office, has announced that the company has decided to carry an enlarged stock of motors and spare parts at the Natoma warehouse. The concern will also maintain a service department there.

The Hi-Voltage Equipment Company, Cleveland, Ohio, has recently issued Catalog No. 3. The booklet deals with the company's line of high voltage switches and substation equipment. It is well illustrated and shows applications of much of the apparatus.

The Dewalt Manufacturing Company, Lancaster, Pa., has recently placed on the market a new electrical device called the "Dew-All." The machine is a wood-working device and has many applications.

Ajax Electric Specialty Company, St. Louis, Mo., has announced that its patent applications on No. 22 and No. 33 models of plural plugs have been allowed by the United States Patent Office.

The Doerr-Mitchell Electric Company, Spokane, Wash., will be taken over by the Brown Electric Company of that city. The Doerr-Mitchell Company in addition to electrical merchandising and contracting, has built up a substantial business in the manufacture of electrical lighting fixtures. Their work has taken prizes at a number of exhibits in widely scattered parts of the country.

The Atlantic-Pacific Agencies Corporation has been organized to supersede and take over the business of the Atlantic-Pacific Sales Company, San Francisco, Calif. W. M. Deming is president; T. D. MacMullen is vice-president and C. C. Langevin secretary of the new company, which will represent many eastern manufacturers of electrical appliances, radio supplies, heating equipment, etc.

Arthur Elston has been appointed sales agent for the Electrahot Appliances, Inc., of Minneapolis, Minn., and will make his headquarters at present at 77 O'Farrell Street, San Francisco. Mr. Elston will devote his time chiefly to the State of California, the business of the Northwest being handled by R. M. Burton, Seattle, Wash., with offices in the Alaska Building.

The Spencer Electric Company, Oakland, Calif., has just completed the wiring of the new building for Montgomery, Ward & Company in that city. This is one of the largest jobs ever installed in Oakland and the work was completed within the scheduled time.

"Washer" Wilson, of Los Angeles, Calif., has opened a new store in Tucson, Ariz. This store is located at 326 North 4th Avenue and is the second store to be opened by Mr. Wilson in Arizona, the other being at 244 West Washington Street, Phoenix.

The Hart & Hegeman Manufacturing Company, Hartford, Conn., has recently issued its 1924 Catalog R. Copies can be secured upon application to the manufacturer.

The Hisey-Wolf Machine Company, Cincinnati, Ohio, has brought out a new side handle drill with 5/16-in. capacity. This drill is fully described in Bulletin No. 106-A which will be furnished on request to the factory.

The Kidwell Boiler Company, Milwaukee, Wis., has just issued advance copies of an exceptionally interesting and instructive catalog on steam boilers and steam generation. The book contains 268 pages and treats in detail of steam boiler construction and operation and gives a vast amount of engineering data.

Personals

Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., has been appointed vice-president of the National Electric Light Association, succeeding the late John A. Britton. Mr. Griffith has long been active in the affairs of the association and has been a construc-



FRANKLIN T. GRIFFITH

tive worker for the entire industry. In his new position he will have unusual opportunities for developing plans and ideas for the betterment of conditions and for the promotion of the general welfare of the electrical business. Having a broad view of western conditions, he will be able to assist in the solution of the problems of that section and will be able to co-ordinate eastern and western views. Under Mr. Griffith's direction his company has made exceptional strides in development and in the promotion of public relations.

W. H. Kaemper, San Francisco manager of the firm of Listenwaller & Gough, was a Los Angeles visitor during the Christmas holidays and reports that his firm is progressing very satisfactorily in the northern city.

C. A. Russell, lighting specialist for the Pacific Gas and Electric Company, San Francisco, Calif., has been made illumination engineer for the same company and will be attached to the San Francisco division.

W. L. Goodwin, operating vice-president of the Society for Electrical Development, New York, N. Y., has returned to that city after an extensive trip to the Pacific Coast.

C. L. Rice, formerly production superintendent of the Hawthorne Works of the Western Electric Company, at Chicago, Ill., and S. S. Holmes, general superintendent of installation of the installation department, have been promoted to be assistant works managers at the Hawthorne factory.

R. C. W. Libbey, for nearly fifteen years with the Simplex Electric Heating Company, Cambridge, Mass., has resigned from that company, effective Jan. 1. Mr. Libbey is now in the East in discussion with his new connections.

A. H. Vorum, assistant purchasing agent of the Western Electric Company, New York City, has been a recent Los Angeles visitor.

J. H. Mull, president of Wm. Cramp & Sons, and W. H. Glocker, consulting engineer for the same company, are spending some time in San Francisco visiting the organization of the Pelton Water Wheel Company, an affiliation of the parent company.

D. T. Mason, of the Southern California Edison Company, Los Angeles, Calif., was recently in San Francisco on business in connection with his company's activities.

George S. West, for several years connected with Catton, Neil and Company, Ltd., Honolulu, has resigned from that company and has returned to this country. Mr. West has been in the Hawaiian Islands for some time and has not been back to the States since his first departure. He intends to take a short vacation before starting in with his new work and will undoubtedly make his home in California.

C. F. Oehlmann of the Public Service Company of Colorado, Denver, Colo., has been re-elected secretary of the Denver Motor Club and Guy W. Faller, assistant vice-president of the company, has been elected to the board of directors of the club for 1924.

D. C. McClure, president of the Rocky Mountain division of the National Electric Light Association, attended the national executive committee meeting of that organization in New York City early in December, returned to Denver and then spent the holidays with his family at Racine, Wis.

J. D. Ross, superintendent of the Seattle city lighting plant, recently spoke in both Aberdeen and Bellingham, before large gatherings of citizens, describing the development of Seattle's municipal light plant and the Skagit River power project. Both cities have under consideration municipal light enterprises.

Wm. A. Johnston, city salesman of The Washington Water Power Company, Spokane, is severing his connection with that company, and on Jan. 15 will enter the service of the Westinghouse Electric & Manufacturing Company at Portland, Ore., as special representative for western Oregon. Mr. Johnston has been with The Washington Water Power Company for ten years, starting in 1913 at Moscow as book-keeper. For the past seven years he has been in the sales department, and has played a conspicuous part in the great sales campaign of ranges, washing machines, and other electrical merchandise.

M. C. Osborn, district manager of Landers, Frary & Clark, New Britain, Conn., is visiting his old friends in Spokane. Mr. Osborn was formerly commercial agent for The Washington Water Power Company and while in their service first realized the possibilities of the electric range.

George E. Jaquet, who edited the Electrical Directory of Canada for 1923, is now a member of the staff of The Society for Electrical Development. After being graduated as an electrical engineer from the University of Illinois, Mr. Jaquet went with the New York Central and Hudson River Railroad. Subsequently he was with the General Electric Company and the Shawinigan Water & Power Co., Ltd. Recently, Mr. Jaquet has been manager of Philadelphia's first electric home, under the auspices of The Society for Electrical Development.

S. L. Case, insulator engineer for the Westinghouse Electric & Manufacturing Company, San Francisco, Calif., has been in Los Angeles for the past week, looking after the insulator business of that company and brings the report that the insulator factory of the company at Emeryville, Calif., started production on a \$25,000 insulator order for the Southern California Edison Company's new high tension line.

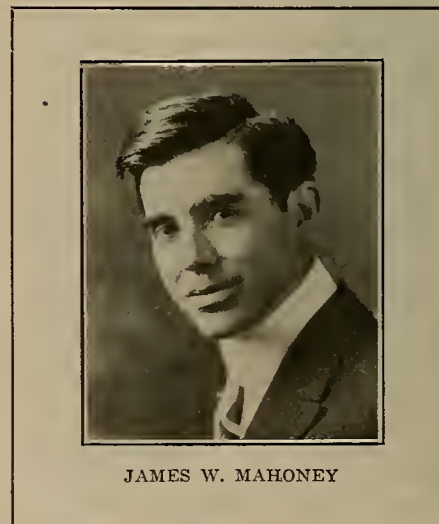
S. E. Gates, manager of the General Electric Company, Spokane, Wash., is about to visit their eastern plants, and will be away for several weeks. Although Mr. Gates has a large territory, he finds time to take an active part in civic matters, especially in the Spokane Chamber of Commerce, of whose Industrial Bureau he has presided as chairman during the past year.

Herbert A. Cram, representative in California, Nevada and Utah for Landers, Frary & Clark, New Britain, Conn., is now at the factory making plans for the ensuing year. Mr. Cram will return about Jan. 15.

George C. Cook, special representative of the American Cross Arms and Conduit Company of Centralia, Wash., was a recent Los Angeles visitor and while here was active with the local representatives of his organization, the Western Electric Company, going through this territory.

C. W. Heinrici of Eureka, Calif., has purchased a one-third interest in the Eureka Electric Company. The partnership will now consist of J. H. Hilficker, Husted Heinrici, and C. W. Heinrici, doing business under the firm name of the Eureka Electric Company, at 36 Fifth Street, Eureka, Calif.

James W. Mahoney, for several years in the auditing offices of the General Electric Company, San Francisco, Calif., has been appointed local auditor for the company. "Jim" Mahoney entered the service of the General Electric Company in their San Francisco office shortly after the fire in 1906 and has been with the firm ever since that time, having



JAMES W. MAHONEY

had various positions. By close attention to the work assigned to him and by conscientious effort he has advanced from one position to another and has earned the responsibilities which have been placed upon him. In addition to his other work he has been the secretary-treasurer of the San Francisco Electrical Development League for the past three years.

A. E. Tregenza has resigned as general sales manager of the Economy Fuse & Manufacturing Company, Chicago, which position he has occupied for the past eleven years, but has not made known his plans for the future.

V. H. Greisser, chief engineer for the Washington Water Power Company, Spokane, Wash., is in the East on an extensive business trip.

Richard Chamberlain, Northwest representative for the Hurley Machine Company, Chicago, Ill., is in Spokane on business for his firm.

J. F. Campbell, city electrician of Pueblo, Colo., was the leader of a "Fireless Christmas" campaign in that city during the recent holiday season which proved of unusual success in that no Christmas tree fires were reported, thanks to his efforts in the use of electric lights.

H. C. Chappell, one of the executives of the Natrona Power Company, Casper, Wyo., and secretary of the Wyoming Utilities Association, was a holiday visitor on the Pacific Coast. He spent Christmas with his son, a naval officer at the San Diego base.

Arthur E. Bacon, newly appointed manager of the electrical department of the Mine & Smelter Supply Company, Denver, Colo., became an electrician's apprentice in Salt Lake City over 20 years ago. First with the Salt Lake City Electric Supply Company, then the Capitol Electric & Manufacturing Company; then with E. A. Eardley, finally he graduated into the supply business with the Western Electric Company in Salt Lake City. Except for a brief period, in 1908, when engaged in special work in the Northwest, the balance of the time has found him identified with the supply business in Denver. From 1908 until 1917 he was with the Western Electric Company, resigning his position in the sup-



ARTHUR E. BACON

ply department of the company to become a salesman for the Mine & Smelter Supply Company. With the recent resignation of James W. Ryall as the manager of the electrical department of that company, Mr. Bacon was promoted to the position. He is considered one of the foremost experts in the mountain region on all types of electric signal systems.

L. D. Collins, special Arizona representative of the Western Electric Company, Los Angeles, Calif., has been in Los Angeles for the past few weeks, conferring with the officers of the company in that city.

Dr. F. B. Jewett, vice-president of the Western Electric Company, New York City, has been decorated with the fourth class of the Imperial Order of the Rising Sun by the Emperor of Japan. Notice of the honor has come directly from Sannosuke Inada, chief engineer of the Japanese Department of Communications. In a letter to Dr. Jewett Mr. Inada has written, "The assistance which you and your company are rendering to our government is gratefully acknowledged by this order." The letter emphasizes the aid rendered by Dr. Jewett in the field of telephone engineering. Dr. Jewett is past president of the American Institute of Electrical Engineers.

Al Johnson, superintendent of the street department of the Public Service Company of Colorado in Denver, Colo., was elected chairman of the local chapter of the Doherty Men's Fraternity. F. F. McCammon was chosen vice-president and H. A. Tewksbury, secretary and treasurer. O. L. Mackell, chairman of the Denver Electrical Cooperative League, was elected a member of the board of directors and was appointed chairman of the entertainment committee at the recent annual election.

Albert Elkin, secretary of the Electrical Contractors' and Dealers' Association of San Francisco, Calif., has resigned from that position to enter the practice of law.

Charles E. Thompson, electrical engineer for the John H. Rosseter Company, San Francisco, Calif., has returned from Mazatlan, Mexico, where he installed the most powerful radio station in that country.

J. J. McKenna, formerly assistant general purchasing agent at the Hawthorne Works of the Western Electric Company, Chicago, Ill., succeeds C. L. Rice as superintendent of production, and W. H. Meese, supervisor of installation methods and results, succeeds R. C. Dodd as operating superintendent of the company at the Hawthorne Works.

T. P. Ward, of the New York Telephone Company, New York, N. Y., recently visited San Francisco.

Harry Billica, district line materials manager for the Westinghouse Electric & Manufacturing Company, San Francisco, Calif., and who has been spending some time in the Seattle district of the company, has been in San Francisco for a few days and has returned to Seattle.

Ralph J. Cordiner of the Edison Electric Appliance Company, Portland, Ore., is visiting Spokane.

A. F. Moriarity, manager of the Colorado Power Company at Alamosa, Colo., is one of the incorporators of the chamber of commerce just organized in that city.

C. D. White, chief electrician, Potter Oil Company of California, has resigned and the position has been dispensed with. In future the electrical equipment, including thirty oil well pumping motors, lighting and oil dehydrating units, will be cared for by contracting firms. Mr. White, one of the pioneer electricians of California, will try raising peaches on his orchard in Sutter County near Yuba City.

Sydney R. Inch, vice-president and general manager of the Utah Power & Light Company, has been called to New York City to join the executive staff of the Electric Bond & Share Company. Mr. Inch was born in Taunton, England, in 1879. He was educated in England and came to America in 1900, going to work immediately for the Montana Power Transmission Company, a predecessor of the present Montana Power Company. He worked up with this company and the Butte Electric & Power Company and later was made manager at Missoula, Mont., of a group of utilities owned by the late Senator W. A. Clark. In 1912 he became gen-



SYDNEY R. INCH

eral superintendent of the Utah Power & Light Company with headquarters at Salt Lake City. In 1915 he was made operating manager of the company and in 1918 was made vice-president and general manager of this company and also of the Utah Light & Traction Company, which position he has held until his recent appointment.

Obituary

Edward Entelman, head of the telegraph department of the Southern Pacific Company, San Francisco, Calif., died on Friday, Jan. 11, 1924, after an illness of several months. Mr. Entelman was born July 7, 1877, and entered the service of the Southern Pacific Company as agent and operator at Bethany, Calif., in 1895. He was advanced from one position to another until he was made head of the department, which position he held until his death.

Charles R. Dougherty, for the past three years working in the financial interests of the General Electric Company on the Pacific Coast, died November 27 at his home in Pasadena, Calif., at the age of 51. Mr. Dougherty began his business career when 17 years of age with the Thomson-Houston Electric Company in Philadelphia, in a clerical capacity. He later became cashier of the Philadelphia office and, in 1894, was made auditor of the Philadelphia district of the General Electric Company. In 1913 he was transferred to Schenectady as a general assistant to the controller of the company. In 1920 his failing health necessitated his coming to California to live.

Trade Outlook

San Francisco

The retail buying of the holiday and post-holiday season has been exceedingly satisfactory and stocks are now in good condition for inventory. Sales for 1923 were generally well above the normal volume and seasonable merchandise, particularly, was in strong demand.

Rural conditions are reported as generally good, although in some sections slow crop returns have reacted to a slight disadvantage. Recent rains, and the accumulating snows in the mountains, have changed the condition of the stock grower as well as that of many ranchers and future prospects are much brighter in those sections which have been affected by the late water fall.

Fruit conditions are generally good and dairies are reported as being especially prosperous.

Building programs continue in extensive volume and money is available for legitimate development, both industrial and domestic. Bank reserves are heavy.

Exports are not up to normal but prospects seem good and exporting firms are optimistic. Japan is still a heavy buyer of many commodities.

Jobbers are starting the new year with satisfactory inventory conditions and manufacturers are in good position as to future deliveries.

Los Angeles

Electrical manufacturers report excellent business conditions at this time, with an abundance of orders on hand and several for extremely large equipment just closed. Due to the extensive building program under way, very good business is being enjoyed by the jobbers and wholesalers of electrical supplies and wiring devices. Manufacturers of motors, manufacturers of wire, and local manufacturers' agents make excellent reports of activity in their lines.

The fall and Christmas appliance business was the best ever enjoyed by local dealers and retailers in this section. Some types of appliances, particularly waffle irons and percolators, went so fast that manufacturers and jobbers were unable to supply the retailers' demand. Fancy lamps for Christmas trees and art and metal lamps for the home moved well. The sale of radio was much better than for the same period last year, and the volume is keeping up beyond expectations.

Portland

Oregon, in general, and Portland, in particular, have never before had so big a business year as the one just closed, substantial gains being shown in bank clearings, postal receipts, custom receipts and crop values.

Production in the lumber industry reached close to five and one-half billion board feet, a gain of 20 per cent over 1922. The mills are taking advantage of the usual midwinter slump by closing down for extensive overhauling and

repairs. Shipments to foreign ports are being maintained in better volume than the domestic orders.

Final figures for the year's building permits issued in Portland are estimated at \$25,000,000, the greatest in the history of the city. One of the outstanding features of the 1923 building program was the large volume of homes—about 3,200, costing approximately \$11,000,000.

Extensive improvements have been made in the last twelve months in harbor and port facilities.

Central stations of this district almost without exception have carried greater loads and made greater energy outputs than ever before. Extensions and improvements have been the rule everywhere.

Seattle

Figures from the local retailers indicate that holiday selling volume for this year was on an average 10 per cent higher than for a corresponding period of last year, with collections at a much higher percentage during the year than was true of 1922.

Up to December 22, 1923, the mills in the West Coast Lumbermen's Association had cut 5,214,937,274 feet of lumber. Production, sales and shipments all made new high records.

Seattle's 1923 water-borne commerce totaled 6,270,000 tons of cargo, the highest in its history, and three-quarters of a million tons over 1922.

The electrical industry reports an average in the business done in 1923 over last year of between 50 and 60 per cent. The spread between the two years is really greater, due to a price reduction during 1923 of more than 10 per cent. It is expected that a further reduction in price lists will be a stimulating factor in 1924. An outstanding feature of the year's business was the volume of generating equipment placed in the Puget Sound territory. Electrification of lumber mills was one of the principal items of new business. Unusual building construction throughout the year stimulated general electrical work, and the holiday business in appliances was very satisfactory.

Salt Lake City

The year 1923 has been one of great activity in the industrial development of Salt Lake City, the State of Utah, and the entire intermountain district.

In Salt Lake City bank clearings for 1923 exceeded those of the previous year by \$110,000,000.

There is a reassuring feeling that agriculture has completely passed its low ebb, and the future looks encouraging.

The Utah Power & Light Company has made improvements and additions during the past year amounting to several million dollars, and contemplates spending a large amount of money each year for the next few years in developing additional power.

The sugar industry has shown marked improvement during the year 1923 over the previous two years.

The iron and coal mines of the Columbia Steel Corporation have been opened and placed on a producing basis. The pig iron plant at Ironton, Utah, has been virtually built during the year, and will be ready for operation early in 1924.

It is confidently felt that the factors which have made for remarkable improvement during 1923 will be reflected in a constant and continuous growth and improvement in all lines of business for 1924.

Spokane

The business outlook for the year 1924 for this section is very good. As compared with the year just closed, industrial plants in general have maintained a higher production level, bank clearings show a substantial increase, there is a greater activity in real estate, and much new work in prospect.

In the Coeur d'Alene district the advance in the price of lead is stimulating production, and it is anticipated that the mines will soon be working to full capacity. There are indications that the Hercules Mining Company may incorporate with other companies controlling a large group of properties.

In the building field, two new moving picture theaters are to be erected and an addition to the Masonic Temple.

The Washington Water Power Company expects to spend \$2,000,000 in improvement of its existing transmission lines.

The excellent results obtained in the merchandising of electrical goods last year have led to plans for great activity in 1924. With attractive displays in six electric shops and with the central stations pushing business, the public will have no chance to forget the electrical idea.

There is still a large amount of wheat unsold, indicating the easy financial condition of the growers. The local packing business is in excellent shape. A marked increase in hog raising is noted.

The Western Pine Association reports that the 1923 lumber cut, amounting to 1,750,000,000 ft., and shipments, 1,500,000,000 ft. with a valuation of \$50,000,000, exceeded any year since 1910. The mills in the association are nearly all located in the Inland Empire.

Denver

Business of the new year has started in a conservative, gratifying manner. Reports of construction, bank clearings and merchandise sales for the old year were far better than had been generally anticipated earlier in the year.

Building operations broke the record of the previous year by \$2,626,155.

Comparisons show that the year just closed ranks second only, in the history of the city, to the big year of 1920, because of war conditions the record year of profits and business.

The electrical industry fared unusually well, the 1923 Christmas sales showing an increase of 25 per cent over the holiday sales in 1922. Figures compiled show a gross business in the territory exceeding \$400,000, of which one-half was done in Denver. Included in the sales were 20,000 tree lighting sets, another record.

Journal of Electricity

10 Cents a Copy

February 1, 1924

San Francisco

Foster and Kleiser



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where you need them



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PORTLAND

SPOKANE

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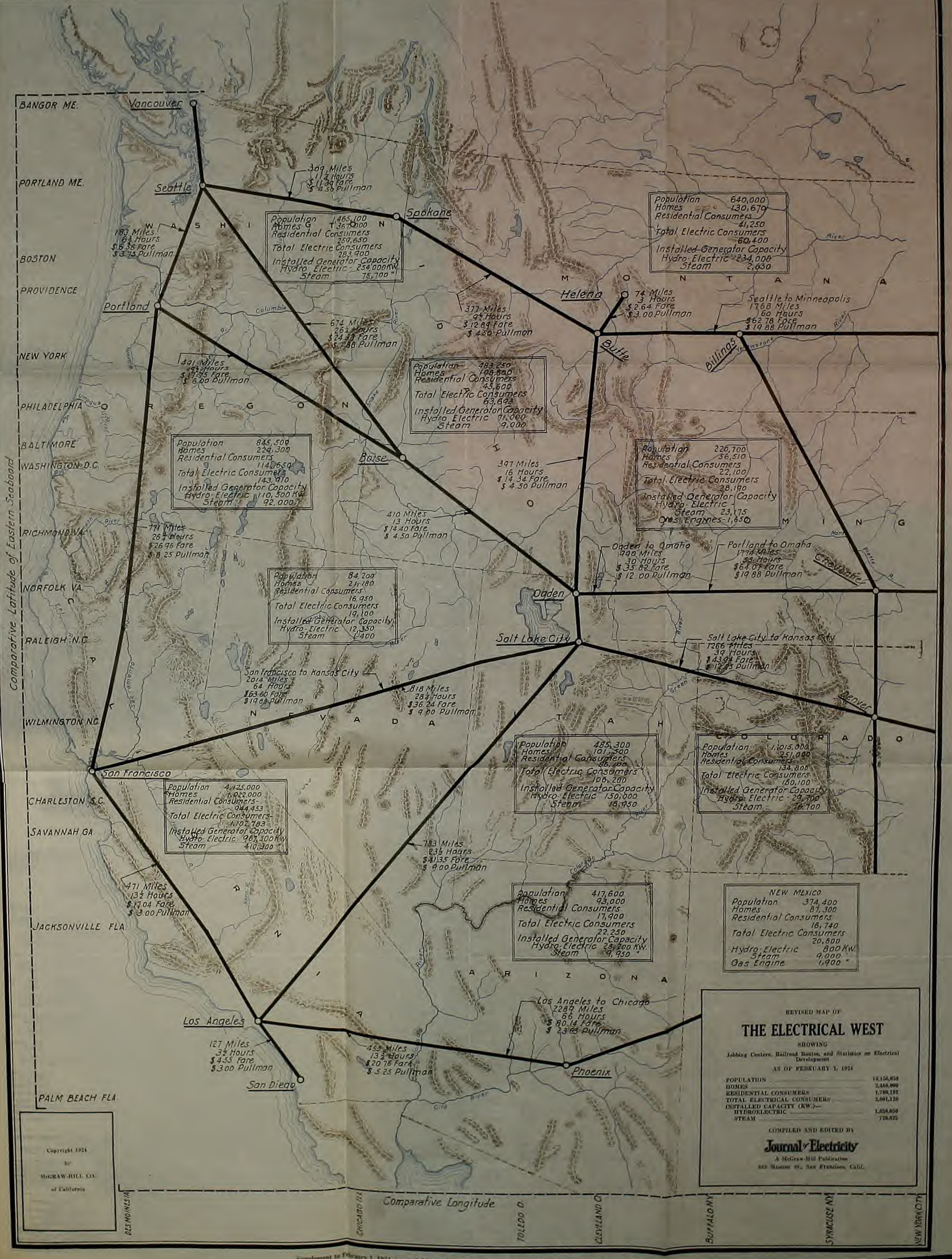
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Porcelain Knobs, Tubes and Cleats
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Comparative Latitude of Eastern Seaboard

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NORFOLK VA.
RALEIGH N.C.
WILMINGTON NC.
CHARLESTON S.C.
SAVANNAH GA.
JACKSONVILLE FLA.
PALM BEACH FLA.

Vancouver
Seattle
Portland
San Francisco
Los Angeles
San Diego

Population 1,465,100
Homes 1,367,000
Residential Consumers 41,250
Total Electric Consumers 60,400
Installed Generator Capacity
Hydro-Electric 254,000 Kw
Steam 75,700

Population 483,250
Homes 408,800
Residential Consumers 45,600
Total Electric Consumers 63,842
Installed Generator Capacity
Hydro-Electric 11,000
Steam 9,000

Population 640,000
Homes 130,670
Residential Consumers 41,250
Total Electric Consumers 60,400
Installed Generator Capacity
Hydro-Electric 234,000
Steam 2,650

Population 845,500
Homes 229,300
Residential Consumers 114,650
Total Electric Consumers 143,910
Installed Generator Capacity
Hydro-Electric 110,500 Kw
Steam 92,000

Population 84,200
Homes 21,180
Residential Consumers 16,950
Total Electric Consumers 19,100
Installed Generator Capacity
Hydro-Electric 12,350
Steam 2,400

Population 226,700
Homes 56,510
Residential Consumers 22,100
Total Electric Consumers 28,190
Installed Generator Capacity
Hydro-Electric 23,175
Gas Engines 1,650

Population 485,300
Homes 101,500
Residential Consumers 86,400
Total Electric Consumers 106,200
Installed Generator Capacity
Hydro-Electric 150,000
Steam 18,950

Population 1,105,000
Homes 251,000
Residential Consumers 134,800
Total Electric Consumers 150,100
Installed Generator Capacity
Hydro-Electric 29,700
Steam 16,100

Population 4,125,000
Homes 1,022,000
Residential Consumers 944,453
Total Electric Consumers 1,102,183
Installed Generator Capacity
Hydro-Electric 98,500 Kw
Steam 410,300

Population 417,600
Homes 93,000
Residential Consumers 17,900
Total Electric Consumers 22,250
Installed Generator Capacity
Hydro-Electric 28,200 Kw
Steam 9,950

NEW MEXICO
Population 374,400
Homes 87,300
Residential Consumers 16,740
Total Electric Consumers 20,600
Hydro-Electric 800 Kw
Steam 9,000
Gas Engine 1,900

REVISED MAP OF
THE ELECTRICAL WEST
SHOWING
Jobbing Centers, Railroad Routes, and Statistics on Electrical
Development
AS OF FEBRUARY 1, 1924

POPULATION	10,156,050
HOMES	2,468,000
RESIDENTIAL CONSUMERS	1,700,193
TOTAL ELECTRICAL CONSUMERS	2,601,126
INSTALLED CAPACITY (KW.)—	
HYDROELECTRIC	1,858,050
STEAM	728,875

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of California

San Francisco

Population 44,500
 Residential 3,500
 Total Electric Company
 11,500
 Installed Capacity
 1,500
 1,500

CHARLESTON

SAVANNAH GA

471 MW
 135 MW
 1704 MW
 300 MW

JACKSONVILLE FLA

LOS ANGELES

127 MW
 23 MW
 23 MW
 23 MW

LOS ANGELES

PALM BEACH FLA

1,500 MW
 1,500 MW
 1,500 MW

San Diego

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SAN FRANCISCO, FEBRUARY 1, 1924

NUMBER 3

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A Word About Our New Map

IN this issue, as an insert, there is a map that is worthy of more than passing interest. It is a "brass tacks" kind of map, that tells at a glance the story of the conditions under which goods must be sold in the eleven Western states.

Consider, Mr. Sales Manager, that these eleven Western states represent 40 per cent of the area of the United States and less than 9 per cent of the population, and contemplate, for a moment, the effect that such conditions have put upon your Western selling costs. To emphasize this further, note the distances and cost of travel between population centers.

Reaching such a market is more of a task than might be imagined from a casual glance at a map hung on an office wall in New York, Chicago or St. Louis. There are some facts about it that this latest map compiled and published by the Journal of Electricity tries to tell. But in addition to its size, this market offers potential sales possibilities that cannot be overlooked.

Consider also, Mr. Sales Manager, that in these selfsame eleven Western states is found a greater development of the electrical idea than in any other portion of the United States, the total number of wired homes being 1,700,193. Then you may draw this conclusion: Advertising, that seeks out the interested prospect, that reaches the established channels of distribution, that directs them toward you and your product, is most emphatically the greatest single element known in reducing selling costs. The Journal of Electricity is the medium through which you can obtain such service.

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Superior

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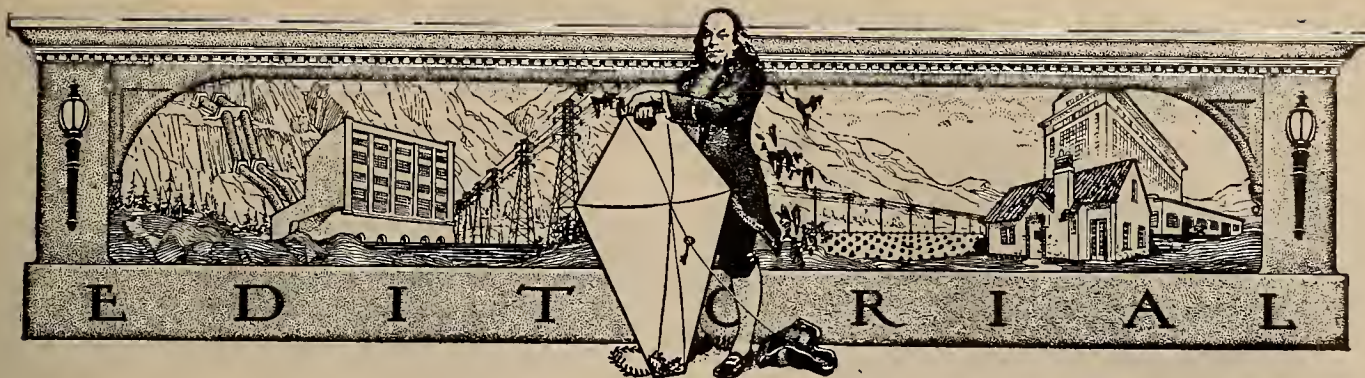


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BRIDGEPORT, CONNECTICUT

NEW YORK
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CHICAGO
844 West Adams St.

SAN FRANCISCO
149 New Montgomery St.



The Electrical West

WESTERNERS are seldom accused of an excess of modesty in speaking of their section of the country. True enough, the West is a country of superlatives, and even the canny New Yorker is shaken out of his proverbial conservatism when he views for the first time the grandeur of our mountains, and the fertility of our soil.

NEVERTHELESS, it is well for the good of our souls, to abandon generalities and get down to figures, cold hard figures, through which the actual facts, stripped of the perfervid oratory of the real estate booster, may be disclosed.

LET us then review these self-same cold hard facts, as they apply to the electrical industry of the West today, and from them extend the curve into the future. Let us not fool anybody, least of all ourselves, as to what we have, and what we may reasonably expect it to grow into.

WHAT makes a market for things electrical? First, a sufficiency of power, and second, customers who will use it. Scrutinizing carefully the statistical material gathered from many sources and presented in this issue, we

learn some interesting things. The census of 1920 showed a growth in new population for the Western states of 4.5 per cent per year since 1910. Even discounting figures presented from unofficial sources showing a present rate of growth much greater than that, it is obvious that the 400,000 new people taking up their residence in the West each year must have homes, and with them electrical apparatus and appliances.

TO provide for these new people, and for those millions already here, electric generating capacity is increasing at the rate of 10 per cent per year, residential consumers are increasing at the rate of 11.5 per cent per year and kilowatt-hour output at the rate of 16 per cent per year.

UNDER such conditions, it is not surprising that the Western states present at once the widest use of electrical appliances in the country, the greatest number of wired homes per capita, and at the same time, the greatest over-all development and application of electrical energy.

THE electrical West is pointing the way to the rest of the world.

Development of Electric Truck Business in 1923

THE electric truck, an appliance which probably uses more energy than any other electric device yet invented, is demonstrating to central stations in California that here is a new business field worthy of development. Overlooked for many years by the electrical industry here in the West, it was forced to go its way alone. Through the efforts of the truck men, a few fleets were sold but little or no recognition of the importance of this market was forthcoming from the central stations.

At the instigation of the Electric Truck and Car Bureau of the Commercial National Section of the National Electric Light Association, a study of the possibilities in this field was conducted in California early in the year. Plans were made for the formation of an Electric Truck Bureau of the Pacific Coast Electrical Association and during the annual convention of that body in June, a definite program for an intensive sales campaign was announced.

The results have been most gratifying, considering the resistance which the Bureau found in its path. Since the inception of the campaign 67 electric vehicles were sold in the Los Angeles metropolitan area and 39 were sold on the lines of the Pacific Gas and Electric Company. Reports indicate that the prospective business in sight is more than sufficient to justify the continuance of the campaign into 1924.

The strides which have been made by the men in charge of this work are indicative of the fact that the possible applications of electricity to industry are many. An idea of the field to be served, a carefully planned campaign for reaching it and a sales staff imbued with confidence are the prime necessities.

Resumé of 1923 Commercial Department Sales Activities

DEVELOPMENT of domestic cooking, water heating and air heating load has been one of the outstanding features of the central station commercial activity in the eleven Western states during 1923. Electric range sales have demonstrated that the public is ready to accept this appliance. Properly directed educational effort has overcome much of the initial sales resistance in many districts and power companies who have directed their sales staffs toward this field have, in many cases, exceeded their fondest expectations.

A careful analysis of sales during the past year indicates that 18,000 electric ranges were installed, representing an increase of approximately 50 per cent in the number of ranges connected. In one locality in the Pacific Northwest there is one range for every five residential lighting consumers while one California company reports one range for every seven.

So important has this phase of central station activity become that a comprehensive analysis of the electric range business will be made in the Pacific Northwest during the coming year where it is estimated that one-sixth of the total number of ranges in the country are now installed. The survey will be

made by an equal number of commercial men and engineers and every factor influencing this type of business will be studied.

The close of 1923 saw commercial department activity branch out into new fields, which promise to equal the domestic market in new business potentialities. Show window and store lighting prospects were cultivated with excellent results. Current-consuming domestic appliances received special attention and heavy duty restaurant and hotel equipment has been installed in many of the large cities as the result of cooperative sales drives in which central station and manufacturers have participated.

A review of the plans for 1924 as outlined by the major central stations indicates that increased sales effort will be applied to electric ranges and water heaters. Air heating promises to develop into an important field for new load. Already programs are being mapped out for intensive window and store lighting campaigns. Domestic appliances of all classes will be featured, in many localities a single appliance having been selected for special sales attention during a two or three-week period. Kitchen lighting units will be made the subjects for special drives during the spring months.

While 1923 might be characterized as having established a record in central station commercial department history, there is reason to believe that 1924 will eclipse it in every way for power company, manufacturer, jobber and dealer.

Public Ownership Might Be Likened to Prohibition

REGARDLESS of individual opinions on the subject of the eighteenth amendment and the Volstead Act, the history of the growth of the prohibition movement and the ultimate triumph of its organized protagonists are of more than passing interest.

It will be remembered that, at first, there were many attempts to force national prohibition upon the people. There was a Prohibition party that nominated candidates for president, as well as for the lesser national and state offices.

Failing to achieve their objective by these tactics, the organized "preventers" tackled the problem through individual state campaigns. A little headway was made, but it was not enough. Then came counties, cities, and the so-called "local option" idea, and then dry spots began to appear upon the thirsty map.

The dry rash spread, at first imperceptibly, and then gathering momentum, the wet areas began to appear as spots, diminishing little by little, until, lo and behold, the politicians began to take notice, and the justly celebrated eighteenth amendment was born, almost overnight, before the patrons of liquid joy knew what had happened to them.

History is said to repeat itself, therefore it behooves those who advocate the continuation of the development of our power resources through private

initiative under commission regulation to stop, look, and listen.

In this issue is a tabulation of power projects contemplated and under way in 1924. In all, there are 40 projects, aggregating 695,050 kw. Of these, no less than eight are municipal or other forms of government-owned enterprises, aggregating 219,000 kw. In other words, 20 per cent of the total number, and 32 per cent of the total horsepower represents a definite step in the socialization of our power development.

There is a lack of interest, a laissez faire attitude on the part of some of the power companies, that may ultimately work to their undoing. They are indifferent to the attacks of the government or state-ownership propagandists unless their individual enterprises are directly threatened. The time may come when they will realize, too late, that they should have defended private ownership wherever it was assailed, in New York, San Francisco or anywhere else. We may learn much from history, if we will only study it and apply its lessons to the solution of the problems of the future.

Application of Electricity to Industry Is Increasing

INDUSTRIAL activity in the West during 1923 was marked by the remarkable increase in the number of electrical applications. Hand in hand with development in the mining, oil and lumber industries has gone the increased utilization of electric power for performing work formerly done by steam or gas engines. Nor have electric applications been confined solely to those industries in which its use has hitherto been common. Central stations and manufacturers have cooperated in developing uses that are both new and unique.

During the past year the application of electricity to the lumber industry has been noteworthy. A number of completely electrified sawmills have been constructed and other mills have changed over from steam to electric drive. Several notable electric logging installations have been made and this field of application is rapidly increasing owing to the greater economy, flexibility and reduced fire hazard which electricity affords.

Resumption of mining activities in most of the districts, especially in the copper regions, brought forth calls for power to supply loads ranging from three to five hundred horsepower. The most notable mining installation was that of the New Cordelia Copper Company at Ajo, Ariz., where a newly completed mill has a load of approximately 10,000 hp. Two electric shovels were placed in operation in the surface mines of the Utah Copper Company at Bingham, Utah.

In southern California electric power was used more extensively than ever before for both drilling and pumping in the oil fields.

The year saw the completion of four electrically driven ferry boats and one oil tanker in California. Economy, flexibility, safety, greater speed and sim-

plicity of control have proved to be the influencing factors in the application of electricity to ship drive. Several electrically operated dredges have been placed in operation in the Pacific Northwest.

The cement industry has been most active, with additional installations in many of the existing plants. Several new mills are contemplated, one of the most notable to be built on the shores of San Francisco Bay. This mill will be completely electrified.

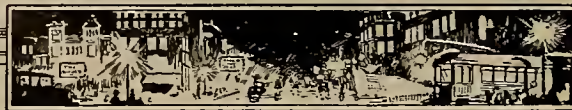
The industrial heating field has furnished a number of interesting applications. An important advance has been made in California where electric heat has been successfully applied to the dehydration of walnuts in two instances. This opens up a wide field for the dehydration of fruits and it is expected that many applications will result from the studies which are being made at the present time. Electric incubation has attracted considerable attention. One installation at Petaluma, Calif., will have a capacity of 635,000 eggs and a power load of 630 kw. Another such installation is being made in Oregon. Such has been the progress in the industrial heating field during the year that almost all central stations are planning aggressive campaigns for this type of business during 1924.

Consideration of the progress in the industrial field during the past year tends to emphasize the statements that have been made that electric power will be the motive force of industry on the Pacific Coast. With a dearth of good coal and with an oil supply that is diminishing rapidly, all industry will ultimately be forced to turn to electric power. The hydroelectric resources of the region are so extensive and the development programs of the power companies so broad that a cheap and dependable supply of energy will always be available.

The Part of the Utility in Community Advertising

THE Washington Water Power Company is issuing an attractive folder, in time-table size, showing on one side a colored map of the territory served by its transmission lines, as well as the general character of the present industrial development, with railroad lines, the more important towns, and the principal drainage systems. On the opposite side there is printed matter describing, in a general way, with numerous photographs, the industries served by the company. This folder will be distributed by the transcontinental railroads which enter Spokane, in connection with the large program for advertising the Pacific Northwest. This booklet is a splendid example of the manner in which a public spirited company can advertise the whole community. No one who reads it can fail to be impressed with the wealth of the natural resources in the region surrounding Spokane, and particularly with the substantial character of a public utility which has, for a generation, aided in the development of that region. The Washington Water Power Company deserves to be congratulated on this effective plan of advertising.

CURRENT COMMENT



In their arguments for municipal ownership of all classes of utilities, both press and politicians are wont to point with pride to the results achieved by the Los Angeles Bureau of Power and Light. Comparisons are made between rates and service in this city and those places where private ownership and public regulation are the watchword. Invariably the comparisons are favorable to public ownership. It may be that only such figures as would tend to create a favorable impression are made public. An interesting sidelight on the Los Angeles situation is given in the current issue of "Edison Partners," the quarterly stockholders' bulletin of the Southern California Edison Company. The company vouches for the authenticity of the information offered. Under the heading, "Los Angeles Service," the bulletin says:

Some Facts About Service in Los Angeles

The Bureau of Power and Light of Los Angeles took control of the Edison Company's Los Angeles distributing system on May 1, 1917 (about five years prior to the actual payment of the money and transfer of title to the city). During this five-year period the business was conducted under an Operating Agreement, by the terms of which the Edison Company was required to turn over to the Bureau of Power and Light all of the collections from Los Angeles consumers served by the Edison distributing system after deducting only bare operating expenses and taxes, together with interest at the rate of 8 per cent a year on the agreed price for the property which the city had the option to buy.

In October, 1920, an ordinance, No. 40890 N.S., passed by the city council upon recommendation of the Power Bureau and Public Service Commission, increased rates to all consumers in Los Angeles served by both the city's own system and the Edison system then being operated for the benefit of the city. No increase was made in the 8 per cent annual interest paid to the company for the use of its system and, therefore, all of the rate increase went to the Bureau of Power and Light. This increase in rates gave the Bureau of Power and Light additional revenue from Los Angeles consumers of \$800,000 a year.

On taking over the Edison distributing system, State taxes amounting to \$412,500 a year which the company had been required to pay were eliminated, since the operating property of the Bureau of Power and Light is not taxable. This gave the Power Bureau an additional net revenue of \$412,500.

The Power Bureau thus had an added revenue of \$800,000 from increased rates and \$412,500 by escaping the payment of taxes, and from this total of \$1,212,500 a rate deduction of \$600,000 was made, leaving the public \$612,500 worse off.

By recent order of the Railroad Commission rates of the Southern California Edison Company have been reduced below the pre-war basis, but rates of the Bureau of Power and Light are still higher than before the war.

The lighting rate charged by the private companies in Los Angeles before the Bureau of Power and Light started operating was 5½ cents a kilowatt-hour and out of this the company paid taxes. The municipal plant began operation in a small section of the city with a lighting rate of 5 cents per kilowatt-hour which shortly thereafter was increased 12 per cent and the present municipal rate is 5.6 cents per kilowatt-

hour, without the payment of any taxes. Private companies are now charged over 10 per cent of their total revenues for State and Federal taxes and municipal plants are charged nothing.

If the Bureau of Power and Light had to pay taxes, its present rate would be 6¼ cents per kilowatt-hour as compared with the private companies' rate of 5½ cents per kilowatt-hour which was in effect before the municipal plant started operation. For the last year's business reported consumers' rates of the Bureau of Power and Light were \$862,500 more than pre-war rates, and taxes which private companies would have to pay on the same amount of business would amount to \$776,260; in other words, to get back to pre-war rates and to give the consumers the benefit of the savings in taxes, present rates of the Bureau of Power and Light would have to be reduced \$1,638,760.

Under its contract, the Edison Company supplies to the city all of the electricity needed which cannot be generated by the municipal plants on the aqueduct. The rate for this service varies with the amount used. The rate for November was .7726 cents per kilowatt-hour. The average for the last twelve months was .8759 cents per kilowatt-hour, which is 22 per cent less than the average rate for the previous twelve months (1.0674c.). The lower average rate for the past twelve months made a reduction in the total bill for the period of \$304,820. A further reduction of 7½ per cent ordered by the Railroad Commission was just made effective on November 15, 1923.

During the past twelve months the Edison Company furnished the municipal system with 80 per cent more electricity and charged only 47 per cent more money for it than in the previous twelve months.

The Edison Company is in a position to supply all the power needed by the city to supplement its own supply—indeinitely.

The disposal of the byproduct power to be generated in connection with San Francisco's Hetch Hetchy project continues to furnish more than its share of

Hetch Hetchy Water and Power Argument

news and comment for the press of that city and also the state. From the start the agitation for municipal distribution has been largely engineered by a certain group of newspapers. The past two weeks have witnessed a change in the attitude on the part of the Board of Supervisors and a tendency on their part to proceed with caution. Exemplary of the more sane tactics that have developed is an editorial in the San Francisco Chronicle under the heading, "After All, It's Water We Want." Excerpts from the editorial follow:

The question which most deeply interests intelligent business men and taxpayers is: What good will come from wasting money in securing a valuation of the electric distributing systems of the two public utility corporations mentioned?

It is admitted at the City Hall that if the city goes into the electricity business it will have to pay twice as much for its own "juice" as it is paying to the private corporation which is now supplying it.

The valuation scheme has been the big fight of those more or less crankily inclined. They admit that it will take more than a year for the Railroad Commission to arrive at a valuation of the existing plants. It will require an enormous amount of money and when it is completed all the city will have to show for the outlay will be a lot of figures on a lot of pieces of paper. Cannot the average business man and the taxpayer see that the whole thing is a huge joke?

The completion of the valuation will not give the city a distributing plant for its electric current. If the corporations refuse to sell at the figures placed on their property, condemnation proceedings would have to follow in the courts. This sort of litigation is long and costly. It might require four or five years to reach a decision.

But the city, in the first place, cannot even offer to buy these plants, or either of them, unless it has the money to pay for them. It cannot get the money unless the voters approve a bond issue.

Summing it all up and simmering it all down we find—just an awful lot of talk.

But do we hear these same men saying much, if anything, about a water supply for the city of San Francisco?

It is a water supply we want. It is a water supply we have been after for a long time—and we have got nothing, not even the much-talked-of electric current.

Is there any reason to believe that if more money is placed at the disposal of these officials there would not be a continuation of the outrageous waste in building a water supply for San Francisco?

The part which Seattle is playing in the attempt to foist a Water and Power Act upon the people of Washington is receiving considerable attention from

Skagit River Development Under Fire

the press of that state. One of the chief arguments against the measure is the demand that Seattle prove its own success before urging the state to under-

take such a highly technical and intricate business as the ownership and operation of hydroelectric utilities. Under the heading, "Let's Play Safety First," the Washington State Weekly says on this question:

Why should the state engage in a risky, burdensome and untried enterprise at this time? Why not wait and let Seattle prove the case for or against municipal ownership?

Seattle owns and operates a light and power utility and also owns and operates its own street railway system of transportation. It still remains to be proved whether or not municipal ownership of such utilities can be carried on successfully.

If it can't be done by Seattle it is surely too risky for the state to undertake. If it can be done, after it is proved is surely a better time for the state to undertake such an enterprise than before.

Why not wait for the proof?

Certain persons, hungry for something to do politically, will object to this, but what GOOD reason can they advance for such postponement? Why should anyone object to a safety-first policy? Why NOT let Seattle show what can be done with its Cedar River dam, its street railway properties and its Skagit development before committing the state to an adventure like that called for in the Erickson initiative?

Seattle is already involved in a \$30,000,000 adventure which promises to demand \$100,000,000 before it is through.

Why not try out the untried here before going into an adventure four times as large on a state-wide scale?

What do the editors of the state think of this suggestion?

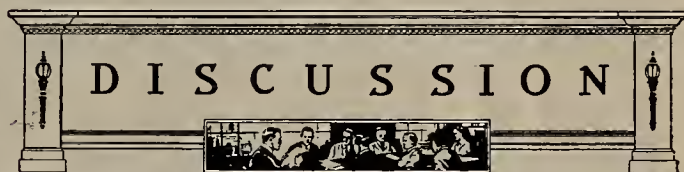
At the request of the Journal of Electricity, C. F. Uhden, chief engineer of the Skagit project of the City of Seattle, has prepared a statement outlining the status of that project and answering some of the objections raised by the press. Mr. Uhden says:

The cost of the first unit of the Skagit plant will be very close to the estimate made by the engineering department in 1920, the difference between the actual cost and the estimate being so small that it is practically negligible. In fact, the actual cost is going to be nearer the estimate than that of any plant which has been built on the Pacific Coast in the past 8 or 9 years. For this reason the City of Seattle should not be criticized in any way but should be given credit for its efficiency.

In addition to the 53,000 hp. we also have a 3,000-hp. plant installed on what we call Newhalem Creek, which is within about ½ mile of the Gorge Plant. Adding this 3,000 hp. to the 53,000 hp. at the Gorge Plant gives us 56,000 hp. which at a total cost, including transmission line and receiving substation, of \$10,600,000, gives us a cost of approximately \$190 per hp. This is an exceptionally low cost per horsepower when we take into consideration the fact that we have constructed in connection with this first development a railroad 26 miles in length which will serve for the entire development; have purchased a right-of-way 300 ft. in width which is sufficiently wide to take care of the power from the entire development. One transmission line, which is now being constructed and will be completed Mar. 1, 1924, has a capacity of 112,500 hp. The tunnel, which is 20 ft. 6 in. in diameter and 10,974 ft. in length, as well as the power house, are of sufficient capacity to take care of 112,500 hp. Our generators, which furnish us 53,000 hp. under the low temporary head, will furnish 50 per cent more energy when the head is finally raised with the permanent concrete dam.

In other words, we have a plant, which with an additional expenditure of four and one-half million dollars, will give us 115,500 hp. or an average cost, including transmission line and receiving substation, of approximately \$130 per hp., which is as low a cost as has been obtained in any power plant which has been built in the Pacific Coast district during the past 10 years.

The Skagit River Development when completed will furnish 550,000 hp. at a cost not to exceed \$100 per hp. This low cost is mainly due to the fact that we are fortunate enough to have an exceptionally large reservoir site which gives us a storage of 1,300,000 acre-ft., the largest artificial reservoir in the United States.



Error in Computation of Load on Conductors Found in Construction Article

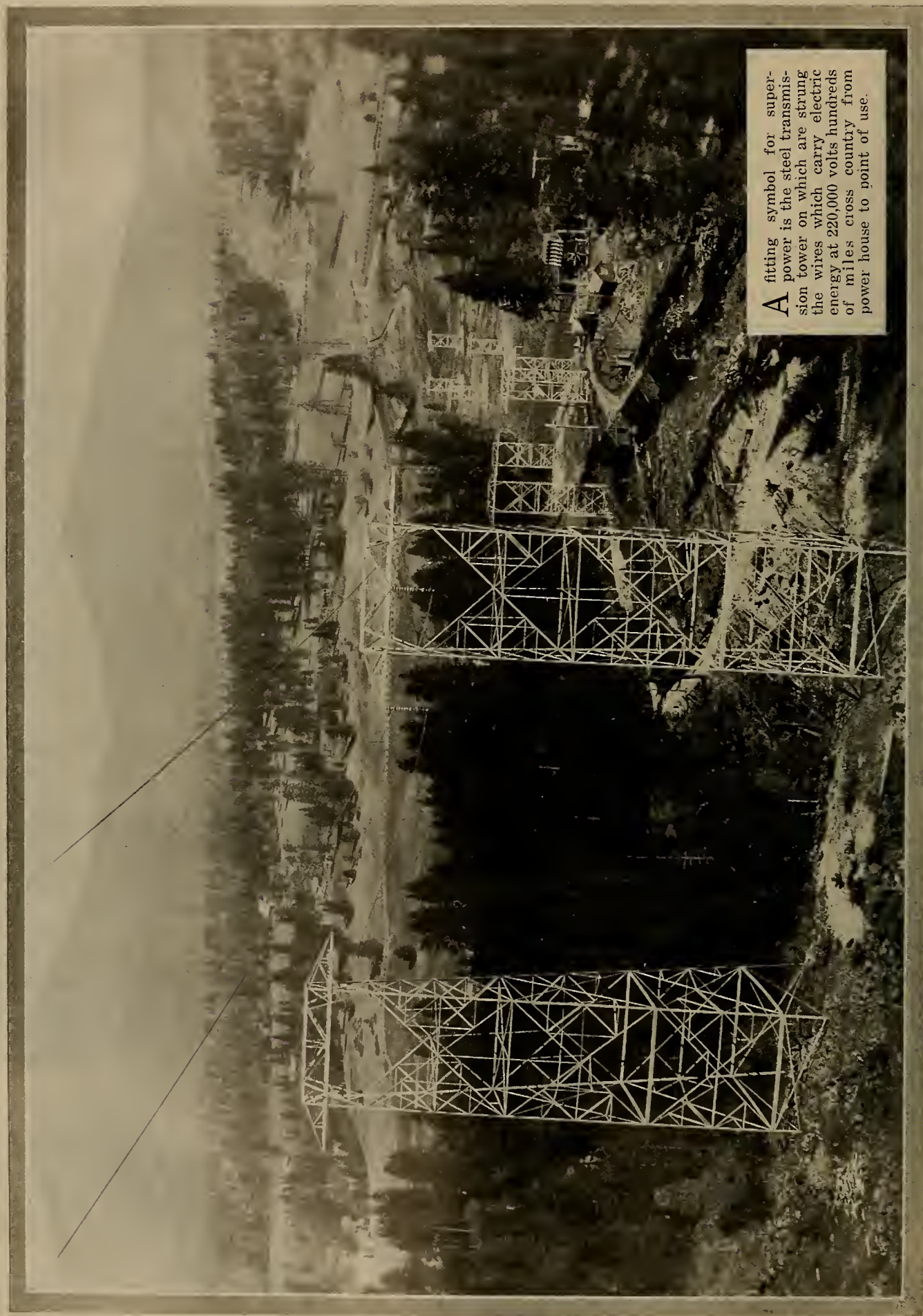
To the Editor:

Sir: Referring to your issue of July 15, 1923, Department of Electrical Construction, article by E. Earle Brown, page 57, paragraph beginning, "Using the last service example as an illustration . . . which would impose a load of 792 amp. on each of two conductors, 442 amp. on each of one conductor, 365 amp. on neutral conductor."

It seems to me there would be 427 amp. in each of the three phase leads, and in two of these there would be the single phase load of 365 amp. added or 792 amp. while in the single phase neutral there would be theoretically no load, or at most one-half of the total range load, that is, 182.5 amp., but for safety and rules we should put in a wire equal in size to the leads carrying the single phase load, or 365 amp.

W. M. HOLMES,
Southern California Edison Company.

Los Angeles,
Jan. 15, 1924.

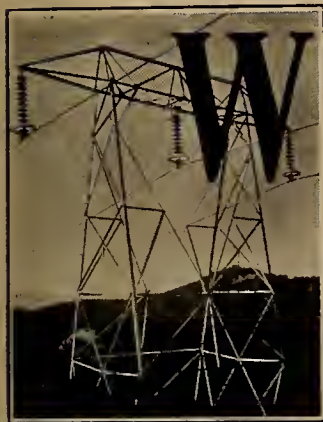


A fitting symbol for superpower is the steel transmission tower on which are strung the wires which carry electric energy at 220,000 volts hundreds of miles cross country from power house to point of use.

Superpower on the Pacific Coast

Means new industries, universal service and decentralization of industry and population. It is the open door to better living, and a powerful factor in our future social and industrial development.

By George C. Tenney
Managing Editor, Journal of Electricity



WHAT is this thing, "Superpower," that has aroused the attention of the nation? First, it is the mobilization of natural power resources and their development to the nth degree. It is another step forward in this age of electricity. Superpower, to the power engineer, means the systematic grouping and interconnecting of the already existing power systems to

the end that greater economy will be effected. It means the creation of large capacity power trunk lines into which plants of a size not hitherto considered feasible will pour their power—lines which may be tapped so that every city, every town and finally, every rural district will share alike in the benefits afforded by an adequate and dependable supply of electric energy.

The chief merits of such a superpower system are that it will tend to stabilize rates for electric service and at the same time extend the uses of electric power; that it will tend to equalize the service and rates for power as between larger and smaller cities, so that the smaller towns and cities may build up industries and may progress parallel with the larger cities; that it will conserve coal, oil and labor.

The professional politician and demagogue are, at the present time, painting a picture of power in all its phases that is at variance with this idea of interconnection. They talk of a politically-owned kind of electric power that is going to act as a monkey gland to the antiquated machinery of the country, giving it new life and vigor and causing new industries to spring up where none grew before. What they are actually doing, or proposing to do, is to inject a slow and insidious poison into the existing system, to break it up into isolated units, in short, to undo the progress of a quarter of a century. Interconnection, and not the program which these short-sighted propagandists propose, will create new industries and ultimately bring about lower rates. It is the purpose of this article to show what interconnection has done and what superpower will do here on the Pacific Coast.

Secretary of Commerce, Herbert C. Hoover, a western engineer and one of the foremost champions of superpower, in his address before a conference of utility commissioners called for the purpose of considering the formation of a New England-Middle Atlantic Superpower Zone, said:

"This super development of large areas of cheaper power has been dramatized by those less familiar with the problem, as the construction of great power highways traversing several states into which we should pour huge streams at high voltages from giant water power or central steam-stations to be distributed to the public utilities and large users along the lines of these great power streams. This, indeed, serves perhaps to picture what is meant by superpower development. As a matter of practical fact, however, the natural development of this situation lies first in the interconnection of power supplies between the existing great utility systems, and, second, in common action for the erection of large units of production at advantageous points for the mutual supply of two or more systems and in the development of such great water powers as the St. Lawrence."

General Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, also sums up the situation comprehensively. He says:

"When several water powers are interconnected, a considerable country is enclosed by the connecting transmission lines. By installing suitable service lines, electric service can easily be given to the whole area thus enclosed. With the water powers developed separately, however, the energy from each is inevitably sent to the nearest congested district, and the regions not actually traversed by the transmission lines are unable to obtain electricity except at a prohibitive cost. . . . With such a system, most of the now wasted water power . . . would be put to useful work, and though supplementary steam plants would be necessary, they would be called upon for a minimum amount of power and, since they would be of the largest and most efficient type, they would consume fuel with the highest obtainable economy. Furthermore, they would be established in the coal regions and at points of convenient access along the coast so that a large part of the railroad facilities now devoted to hauling coal would be released for other purposes. Both the power supplied by the water powers and the demand for electricity by the communities served would, of course, vary constantly, but the great network of transmission lines would act as an equalizing reservoir and would make up deficiencies at one point from surpluses at another. Thus are the views of the statesmen in agreement with conclusions of the engineer. Back of both lies one desire—to bring to the people of the United States and Canada the greatest possible prosperity."

Frank G. Baum, undoubtedly one of the greatest engineering authorities on superpower in the coun-

try, has laid out a nation-wide program for super-power systems in the United States. Mr. Baum has the following to say on the subject:

"Superpower means the mass production and transmission of kilowatt-hours, or the mass production and transmission of energy, to be distributed to many industries and communities for their needs and for the betterment of the conditions of mankind.

"A power system 'rents' out the use of its plant at different times during the day, week and year to the different users, just as a bank rents out its money to different users. The purely local demands on a bank may vary widely during different seasons of the year but the demands on all the banks of the country may be quite steady. The local seasonal demands caused great hardship and high interest rates before the organization of the Federal Reserve banks. The local demands on a power plant will, similarly, vary widely, but the demands on a large power system covering a wide area and supplying diverse industries, will be much more uniform, and therefore the large system can supply power more cheaply than can the small local plant. This diversity may be said to be the life of the power business. Thus large regional power districts interconnected to form a national power system may be compared to the regional Federal Reserve Banks that form the Federal Reserve Bank system.

"The successful railroad systems in the United States have emerged from the maze of railroad construction by the grouping together of parts of sys-

tems so related in territory that a very large and diverse traffic resulted in stable earnings. A further grouping into a few large systems is now contemplated and has been legalized by Congress. Similarly the successful electric power system has resulted or will result from systems covering very wide areas serving diverse industries and communities, in order to build up stable earnings and to give service at the lowest possible rates.

"Aside from the economies of such an interconnected power system, resulting from the 'banking' or mobilization of the power facilities, the power conditions throughout the area tend to become equalized, resulting in a distribution of population and industries not otherwise possible, in adding to the general stability of the country and in a great saving in capital and operating expenditures for the industries and cities served. In this problem of decentralization no doubt the electric power system will play a very important part, thus contributing to national stability."

One other man has expressed his opinions on the subject. Governor Pinchot of Pennsylvania, in a statement following the creation of a Superpower Committee by the legislature of that state, said:

"One reason why I am so interested in giant power is that it means enormously greater supplies of mechanical energy for our people. The more power per capita a commonwealth uses, the higher the place of that commonwealth in the scale of material civilization.

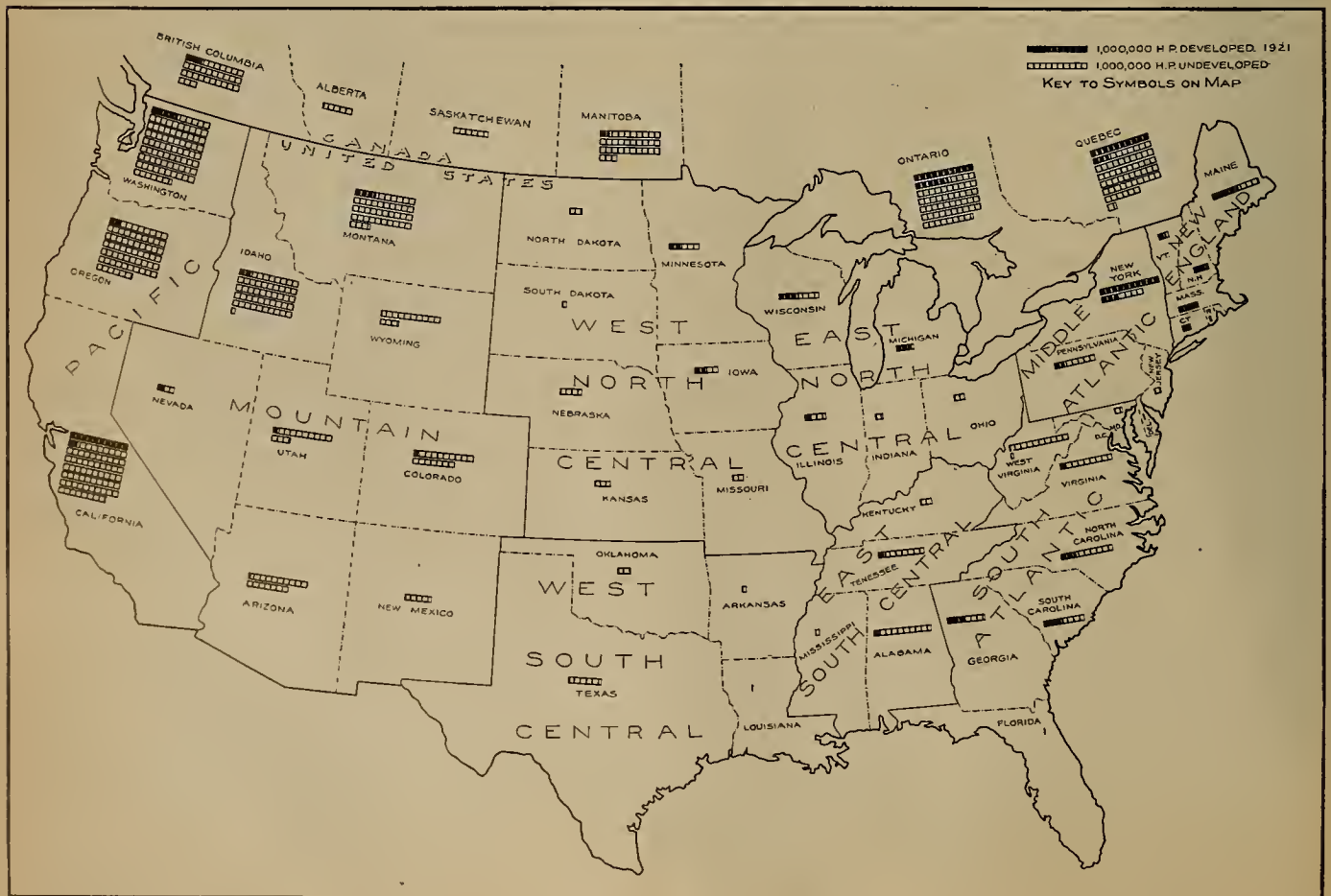


Fig. 1 showing developed and undeveloped water power resources of United States and Canada.

"Power means wealth, comfort, safety, progress. Great blocks of our people fail to get what they should out of civilization, because they are able to get and use far less power than they should.

"Giant power means that more people will get more power than ever before. It is the open door for better living to all our people, and that is true not only in Pennsylvania but of the whole United States."

Now, what relation does all of this national publicity and agitation for superpower have to those states west of the Rocky Mountains? Why should the electrical industry of these states, the business men and the people at large, concern themselves with schemes affecting the New England and Middle Atlantic states, Pennsylvania and the states bordering upon the Great Lakes? The first reason is that seventy-three per cent of the available water power resources of the country are situated in the Mountain and Pacific States. There is more than enough power available in the Columbia River and its tributaries and the Colorado and its tributaries to supply the future demands of the regions adjacent to these streams. If we on the Pacific Coast and in the Mountain states are to benefit to the highest degree from these enormous power resources, we must look to the East for a market for our surplus, for a long time at least. Fig. 1 shows the nation's water power resources.

But the fundamental reason for being interested in this superpower agitation is this: there exists right under our very noses, so to speak, an interconnected system—a superpower system, if you would call it that, which transcends the fondest dreams of those sections of the East which are now just beginning to discuss interconnection.

Picture if you can the network of interconnected transmission lines which covers California, Nevada and Oregon, extending from the Mexican border to the Columbia River. It has a generating capacity of approximately 1,850,000 hp. It serves a territory whose population is over 5,000,000. And it serves 1,214,000 consumers. In the Pacific Northwest there is an interconnected system which extends from Seattle to the farthest reaches of Montana. This system has a generating capacity of 720,000 hp. and serves 280,000 consumers. Between these two systems there are two short gaps whose total length does not exceed 25 miles. The electrical industry is planning to close these two gaps within the year. As a matter of fact, one of them is being closed at the present time.

The lines of the major companies serving Idaho and Utah are already connected, and the day is not far distant when all the transmission systems serving California, Oregon, Washington, Idaho, Montana, Colorado, Utah, Nevada and Arizona will be joined into one great system.

The assumption that such interconnection denotes common ownership is incorrect. One group which is agitating government ownership of hydro-electric utilities has characterized superpower as a "super trust." In no sense is this true. The same diversity of ownership which exists at the present

time will be in no manner affected by the interconnection of adjacent power systems. Community of interests for the benefit of all consumers rather than common ownership is the goal toward which superpower aspires.

Physical features such as voltages, miles of wire, and generating capacity have little or no meaning to the layman. He wants to know what this interconnected system means to him, a business man in Yuma, Ariz., or in Spokane, Wash. Again quoting Mr. Baum, an illustrative analogy may make this plain:

"A superpower system compares favorably to a large bank in its economic function, and the electric medium of transmission may be compared to money, the medium of property exchange. If we had no money, then property would be the medium of exchange, but if we had money and no banks or depositories then the difficulties of conducting a business would be almost insuperable. Without a central distributing system each consumer must develop his own power and a surplus. There is no medium of exchange and there are no banking facilities. Electric transmission provides the electric medium for exchanging any one form of mechanical power to any other form at some distant point on the system.

"Now if one hundred isolated power plants were connected together by a transmission line and the power producing possibilities thus concentrated, we would then be able to supply the wants of the original one hundred consumers and have a considerable surplus. This surplus is principally due to the fact that the diversity of interests now supplied from the system are such that the system has a more uniform load, a better 'load factor' than the individual plants operating separately.

"Having connected the one hundred consumers by a single transmission system having a large power demand, we find we no longer can afford to operate the one hundred small plants supplying this energy, but by the construction of one or two large plants, we are able to supply the entire load at considerably less expense. At the same time power service is extended to all users alike by the large economic system."

The factors affecting this saving may be summarized as follows, according to Wm. B. Jackson:

"1. Saving in power house equipment made possible through taking advantage of the diversity of loads.


"2. Lower generating costs due to larger plants and improved load factor.

"3. Less investment per kilowatt of capacity due to larger plants as compared with smaller.

"4. The possibility of decreased percentage of spare apparatus due to a better arrangement of plants.

"5. Saving in cost made possible by centralized management, general superintendence and other expenses.

"6. The possibility of supplying other intermediate consumers at points between the original purely local plants.



SUPERPOWER connotes efficiency and economy in the generation and transmission of electric energy. At two widely separated points are two great hydroelectric stations, one fed from a reservoir in which is stored the water from melting snows, the other with water from ever-flowing springs. Each pours its energy into a trunk transmission line, where it is carried at high voltage over great distances to market centers. Here the voltage is stepped down and again distributed to the big cities where it is used by industries and in the homes, to smaller communities where it performs the same duties and to the rural districts where it lightens the farmer's daily tasks.

OTHER plants feed into this trunk power line. When power is short in one district, a station far distant will make up the shortage. If one plant should necessarily shut down, another picks up its burden. More energy is supplied at a lower cost as a result of such interconnection. At the same time electricity is made available to every district through which the trunk line passes. Through mobilization of resources, the power conditions through the area served become stable. A distribution of population and industry not otherwise possible results. Living conditions are better for an adequate and cheap supply of electric power means wealth, comfort, safety and finally greater progress.



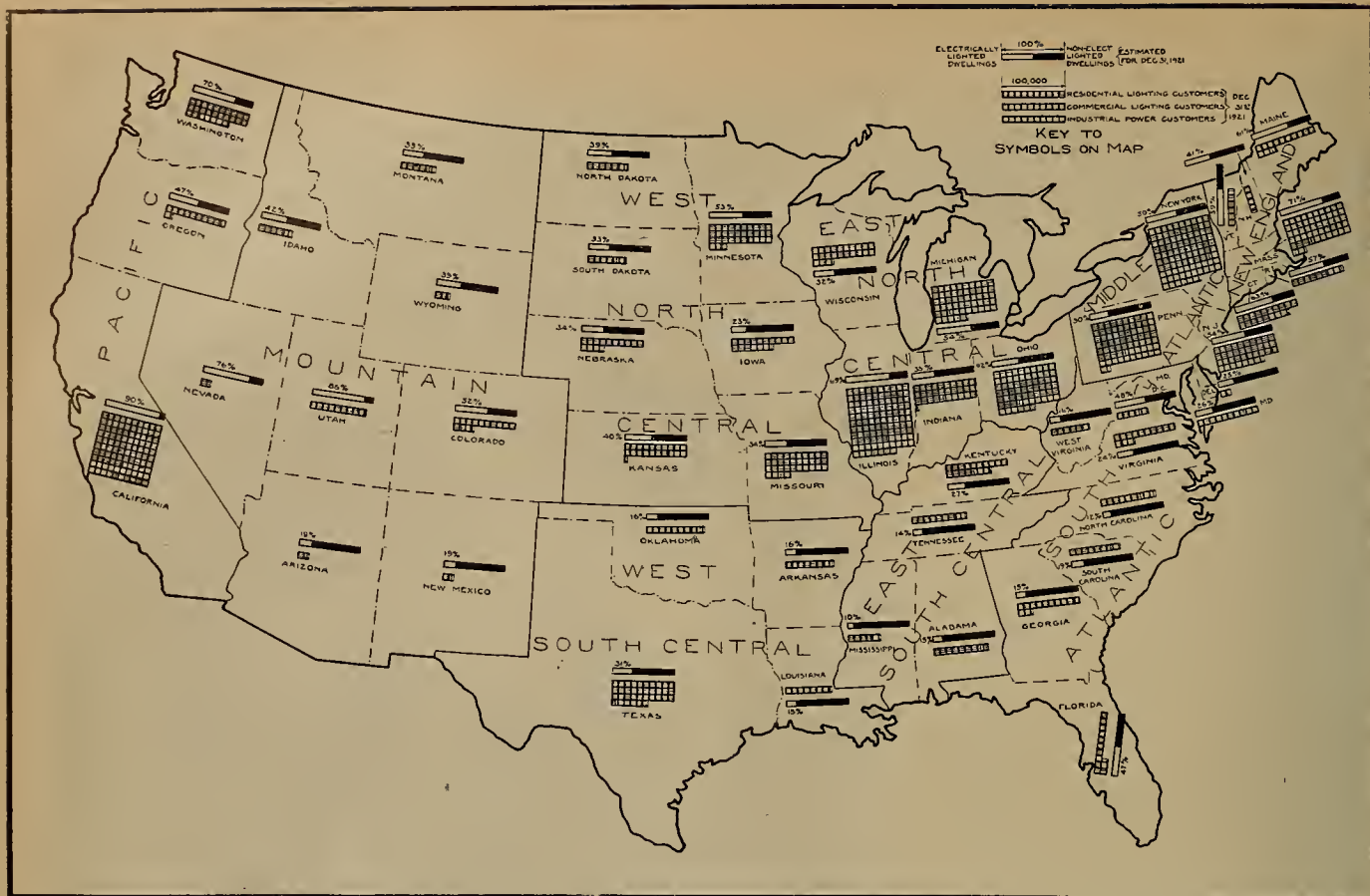


Fig. 2 showing electric consumers of all classes and percentage of wired homes for United States.

"7. The development of large and distant water powers to supplement the local fuel consuming plants."

In a few words, this summarizes the economic story of superpower.

But there is another side, which is ably demonstrated in our own region of interconnected power systems. Electric service is essentially the same on the Pacific Coast in cities of 5,000, of 50,000 or of 500,000 population. Universal service has been the watchword of those men who have pioneered these systems. The result has been that the same service rendered in a large city is available to mining camps in the mountains and to the farms, the small towns and the small industries. This has resulted in a distribution of population and industries in California not otherwise possible and very often it has resulted in establishment of a small factory, a rock quarry, a cement plant or a farm at a point not otherwise economically feasible, thereby adding to the general prosperity of the region.

As an example, let us consider the case of a small cotton mill in Virginia. It is located in the mountains on a small branch railroad line. Its raw product, cotton, comes largely from Louisiana and Texas, and its finished product, cotton fillers for sugar sacks, etc., is shipped to California and elsewhere. The plant is located at this isolated point because there is water power available at that site. Uneconomical arrangement, you must grant, but necessary at the time the factory started. Imagine the saving that might be effected were the plant located at either the

source of the raw material or at the point of utilization of the finished product, with power supplied by a high tension line which brings the energy to run the machinery from a large water power plant on the banks of a river many miles away.

The following quotation from the "Electrical World" explains this point more fully:

"The transportation of electric energy is the least of the transportation problems which today confront industry. A new manufacturing center means new difficulties in the accumulation and distribution of material vastly more troublesome than any electrical distribution which would tend to place the plant in a better situation as regards the transportation marked as a whole. Further it is undoubtedly desirable to check the extreme centralization of industry which is now going on. It would be much better to distribute the work over fifty towns and cities than to concentrate it in one of them, where, inevitably high expense, a difficult labor situation and overcrowding with all its attendant misfortune, will hold sway. To be perfectly frank about it, a large industrial city is usually by no means a pleasant place in which to live, rarely well governed and almost universally over-taxed. In this civic sense the work of the distribution system which brings cheap power to the country at large, instead of confining it, as now too often happens, to a few big centers, is of primary importance."

In the last analysis, what is the measure of the efficiency of our electric service on the Pacific Coast? Is it not in the number of homes we have reached

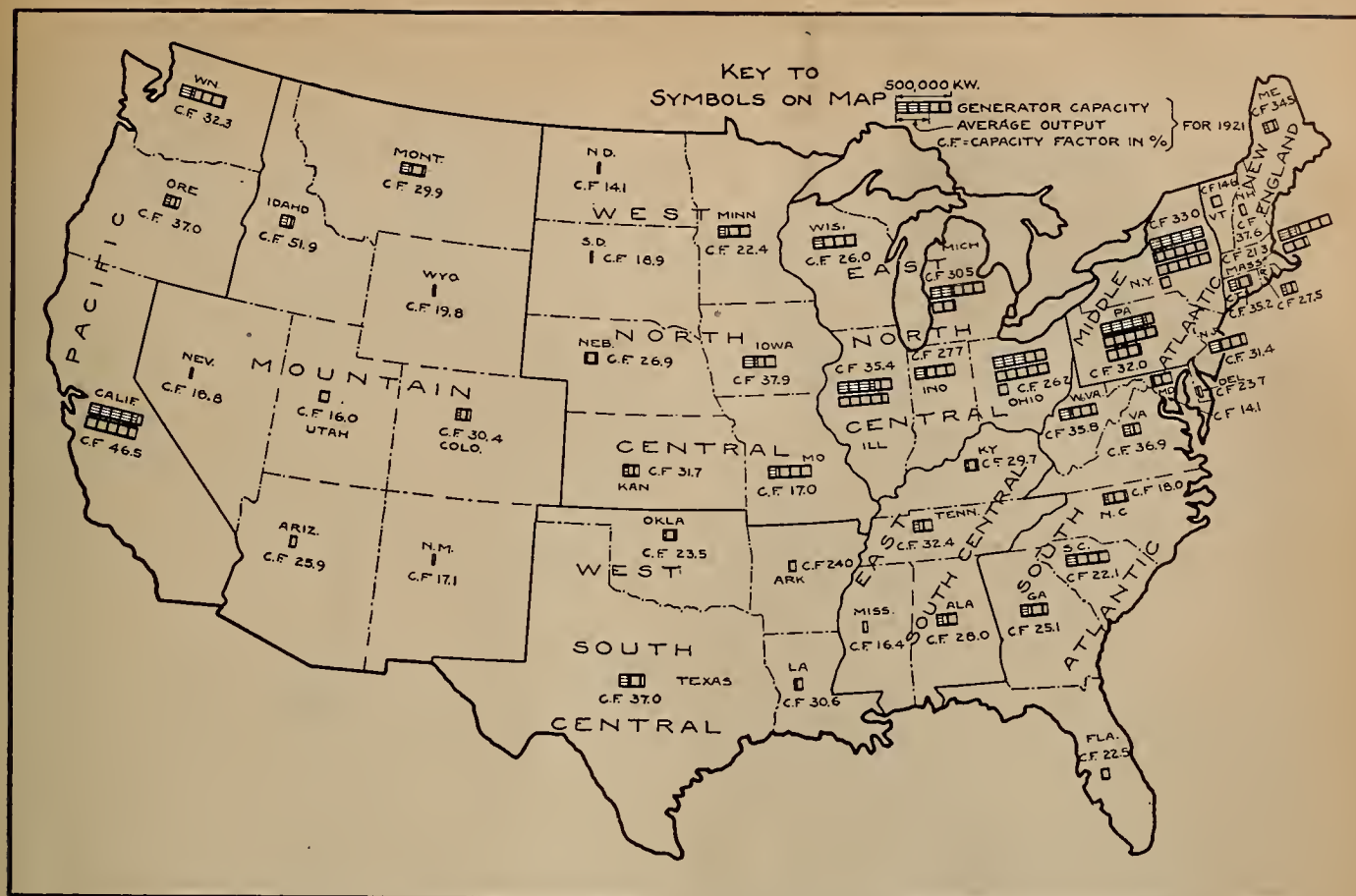


Fig. 3 showing generator capacity, average output and capacity factor for United States.

and in the extent of which we are availing ourselves of the natural advantages of our power resources? Fig. 2, which is taken from Mr. Baum's "Atlas of U. S. A. Electric Industry," shows the percentage of wired homes for every state in the Union as well as the number of electric consumers of various classes. Regarding this chart, Mr. Baum says:

"Out of the total of 11,000,000 electric consumers, California has more than 1,000,000 or one for every 3.5 persons, whereas in the United States there is approximately one customer for every 10 persons. California has about 9 per cent of the total residence customers, 10 per cent of the total commercial customers and 15 per cent of the total industrial customers compared with 3.5 per cent of the population. The most surprising showing, however, is that California has 64,000 industrial consumers as against 42,600 for Illinois, 30,500 for Pennsylvania, 27,350 for Ohio and 25,550 for New York."

The degree of efficiency of utilization of our power resources is indicated by the capacity factor (the ratio of the average load to the total installed capacity of the generating plants, which is really a measure of efficiency of plant investment. Fig. 3 which is also taken from Mr. Baum's "Atlas," shows that California with a capacity factor of 46.5 and Idaho with a factor of 51.9 lead all other states of the Union by far. It will be noted from the map that Missouri has a capacity factor of 17 while South Carolina, one of the states in the proposed Southeastern Superpower Zone, has a factor of 22.1. This means that California is producing almost 3 times as

much energy as Missouri and twice as much as South Carolina for each horsepower of installed generating capacity. The reason for this is obvious. Interconnection of the large power systems in California has made possible these remarkable economies. And it is safe to say that if the two 220,000-volt transmission lines operating in northern and southern California were interconnected so that there might be a free flow of very large blocks of power, uninterrupted, as Secretary Hoover says, by state and municipal boundaries, this capacity factor could be made to approach the load factor for the two systems or the state.

Right here it might be well to point out one of the greatest dangers of the municipal projects such as are already under way for Los Angeles, Seattle, Tacoma and San Francisco and which are proposed for Sacramento and other Pacific Coast cities. The uninformed politicians who are sponsoring these projects are breaking down this great economic interconnected power system which has been twenty-five years in the building, creating in its stead a number of isolated systems serving their particular cities. By so doing they will turn back the wheels of electrical progress twenty years. They will place California and other states on the Pacific Coast in the position of those eastern states which are just now recognizing the benefits to be derived from superpower and are making for the earliest possible creation of large power zones.

To use again the analogy of the bank, the short-sighted politicians would create a series of small

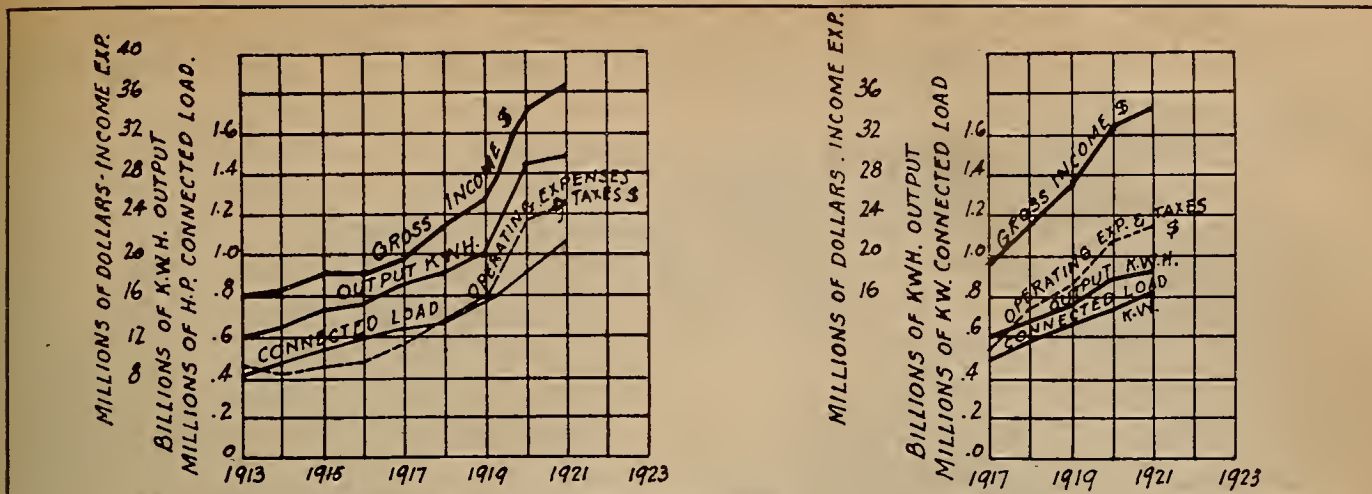


Fig. 4 showing relationship between large interconnected system (on left) and system of similar size made up of small isolated units (on right).

isolated banks, each with its own medium of exchange. No sane business man would recommend the decentralization of the national banking system or the destruction of the Federal Reserve system and the creation in its stead of local banks with no standards of currency and no means of exchange. Such retrogression is preposterous, yet political propagandists seek to undermine the economic structure of our electrical system which has proved sound under every test, and to demobilize the power resources which interconnection makes available.

Fig. 4 demonstrates this point. It compares the interconnected system of one large company operating in one state and serving two hundred communities with 1,500,000 population, with the system of another company made up of small scattered units in 17 states serving almost the same number of communities with 2,250,000 population. It can readily be seen that for the same gross income, and with approximately the same operating expense and taxes, the interconnected system is furnishing 65 per cent more energy than the system made up of isolated units, thus showing the economies of the large concentrated system. Is it any wonder, then, that the interconnection of the power systems on the Pacific Coast insures the greatest possible conservation of our water resources, guarantees the maximum dependability of power supply and results in an economy which reflects itself in the widest possible service and the lowest average energy rate consistent with the character of service rendered?

Nor is it to be imagined that state ownership would prove a panacea for the ailments which the politicians and yellow press ascribe to existing power systems. It is reasonable to believe that so long as our present method of government continues, the large city will dominate any commission or board which might be elected or appointed to administer the affairs of a state-owned power system, to the detriment of both smaller city and farmer alike.

What of the men who have pioneered and made possible this superpower zone here on the Pacific Coast and elsewhere? Secretary Hoover, in his plea

for superpower, paid them a high tribute when he said:

"It is fitting that I should make some remark upon the progress and ability shown by the whole electrical industry since the days of Mr. Edison's initial genius. They have come to have a large vision of cooperation and service and have in a very large measure realized their responsibilities to the public. One great mark of their progress is, that despite the greatly increased cost of labor, coal, oil and other materials, there is but little, if any, increase in the cost of light and power to the consumer today over pre-war prices. Under the protection of state regulatory bodies over 2,000,000 of our people have invested their savings in this industry. From an annual utility production of four billion kilowatt-hours twenty years ago we have increased to fifty billions today with an increase in consumption from 60 to 500 kw-hr. per capita. It is a magnificent achievement of the initiative and ingenuity of these industries, and that it has attained such a growth under public regulation is itself proof of the ability and cooperation of our public officials. I believe that the same vision applied to the wider problems which spread before us will maintain the same initiative and secure like progress in the future."

Superpower is not visionary. Here on the Pacific Coast it is an accomplished fact, not perfect by any means, but fast approaching a stage of perfection that will be reflected in greater economies and a more universal use of electricity. There will be no more important factor in our future industrial and social development than cheap, abundant and dependable electric energy. Few other factors have more important social relations or give greater promise, by the progressive substitution of mechanical for manual labor, of raising the economic level and improving the social status of this country. And superpower, administered by that same private initiative and public regulation that has fostered and developed it to its present state of progress on the Pacific Coast, will do all these things. The men who are doing this work are doing a public service of the highest order. Why change?

Appliance Sales Possibilities of the West

CHILDREN sometimes have what are called "growing" pains, pains that are incident to rapidly increasing stature and girth. Countries also have growing pains, and sections within countries likewise. These "pains," if they may be so called, find their reactions within the machinery of commerce, when the demand outstrips the ability to fill that demand.

The good old days when everybody in a community knew everybody else in that community by his or her first name have practically disappeared. Local distribution of the most primitive sort, with its general merchandise store has been succeeded by nation-wide distribution with its multiplicity of agents, district offices, jobbers, retailers and special representatives.

It is a far cry between the stocking of staples in the general store to meet the simple need of the small community to the market survey with its wealth of statistics upon which the great industrial organizations of today base their sales campaigns for a given period of time.

To a greater and greater extent as time goes on, the business paper has delved deeper into the economics of the industry that it serves, in order to render an increasingly valuable service to its clientele. Only a few of the larger industrial organizations have the facility to undertake market surveys on their own account. By far the great majority of concerns operating within a given field rely upon their business paper for a periodic market analysis, for the general statistics of their industry, in short for the data upon which they may forecast, with reasonable accuracy, the volume and kind of business in store for them during the forthcoming year.

Conforming to its usual practice, the Journal of Electricity has made a market survey dealing essentially with the domestic market for electrical appliances within its geographical field, the eleven Western states. In all, a period of more than three months was required in seeking and compiling the data gathered from many sources.

The method followed was that of the questionnaire. A list of several thousand names was compiled from residences given in the telephone directories covering both urban and suburban localities in each of the eleven Western states. The number of questionnaires was proportioned to population in each state, in order that a cross-section as nearly accurate as possible might be obtained that would disclose the actual situation in the various localities surveyed.

It is regrettable that these data are not available from official or governmental sources. Some day some department of the government, the Department of Commerce, for instance, will recognize

A survey of homes conducted by the Journal of Electricity in the eleven Western states discloses the extent of the market available to distributors of electric household appliances and supplies.

the importance of such information in contributing to the industrial progress of our country, and will undertake this work as a matter of public welfare. In the meantime the responsibility has devolved upon private enterprise, which does the

best it can with such means as are at its disposal.

It may be said at this time that the response to the Journal of Electricity questionnaire was unusually good. Every possible means was taken to bring about this result. Every householder addressed was assured that he or she would not be quoted; the reason for making the survey was given clearly and concisely. Stamped, self-addressed envelopes were enclosed with each questionnaire in order to reduce the resistance to the request to the lowest possible point. In cases where questionnaires were returned uncalled for, additional names were used in order that the proper proportion of names to population might be maintained.

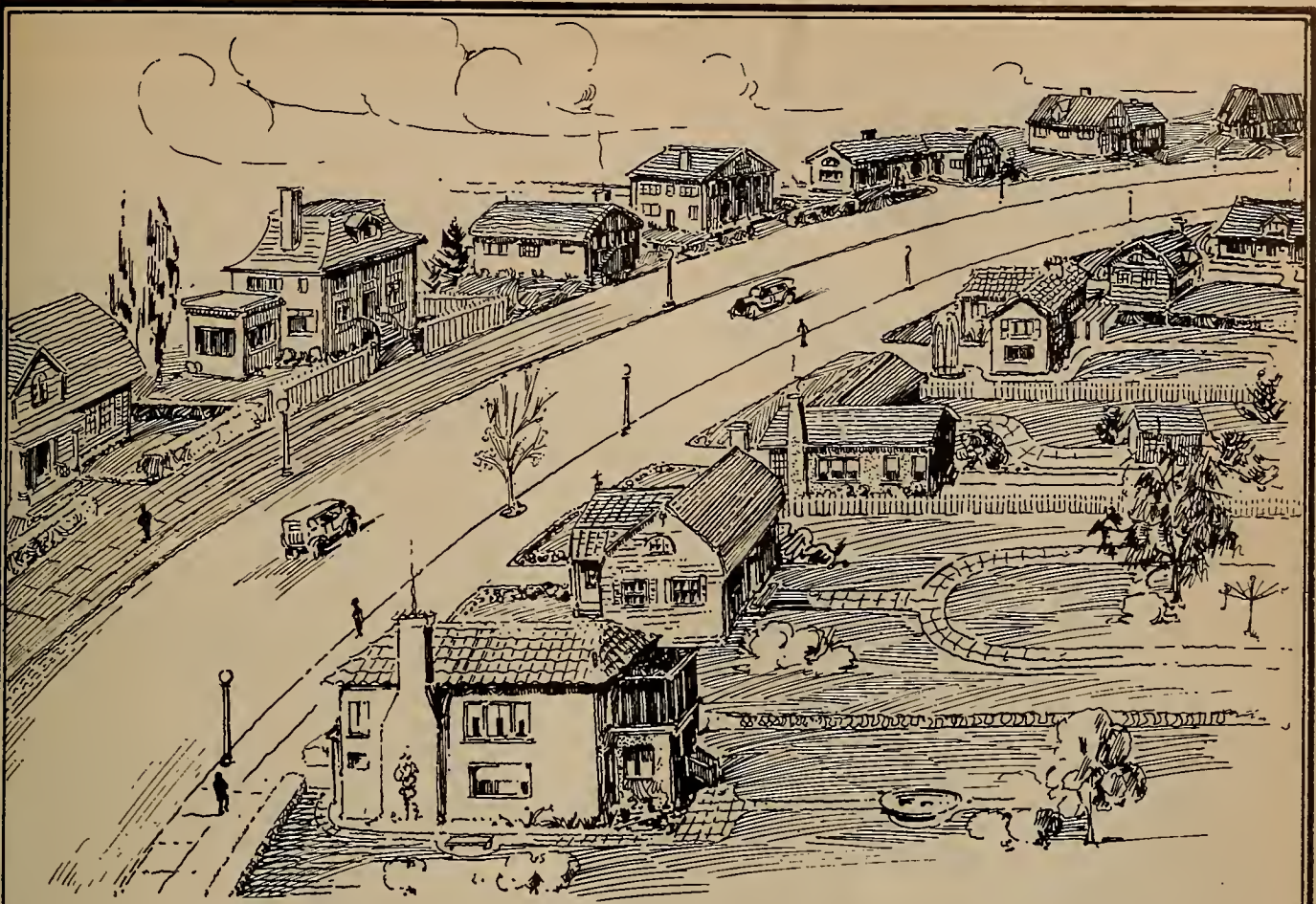
From the data received, a tabulation, presented here, shows the number of electrical appliances per hundred wired homes in California, and in the eleven Western states. As was to have been expected, the greater electrical development in California, as compared to the eleven Western states as a whole, has brought about a correspondingly greater use of appliances, the difference in some cases being as great as 50 per cent in favor of California.

Howard A. Lewis, business manager of Electrical Merchandising, divides electrical merchandise into four classes:

1. Staples and necessities
2. Vogue, style or fad items
3. Specialties
4. Pioneer or exploitation items.

This classification by Mr. Lewis is exemplified in an interesting manner in the figures prepared. The electric iron, one of the pioneers in electrical appliances, shows no less than 110.6 irons per hundred wired homes, or slightly in excess of one iron per home, while the number of pioneer or exploitation items such as the electric range, the dishwasher and similar appliances are but slightly in excess of one per hundred homes. Not the least interesting item of comparison is that of the range, which in California shows but 1.3 per hundred homes, while the number in the eleven Western states is 4.4 per hundred homes. This is probably due to the fact of the great quantity of gas used for cooking in population centers within California, a type of fuel not available to nearly so great an extent in the other less thickly populated Western states. Gas competition would appear to be an item of no small importance in the pioneering of electric ranges.

The vacuum cleaner seems to have made a very strong appeal to households in the comparatively few



Of Every 100 Wired Homes

IN THE WEST—

19 have Air Heaters
 4 have Chafing Dishes
 22 have Curling Irons
 6 have Disk Stoves
 1 has Dishwasher
 1 has Electric Cooker
 6 have Electric Toys
 86 have Flatirons
 16 have Fans
 28 have Floor Lamps
 14 have Grills
 3 have Hair Driers
 1 has Immersion Heater
 3 have Ironers
 2 have Milk Warmers
 1 has Mixer
 34 have Percolators
 10 have Radio Sets
 4.4 have Ranges
 1 has Samovar
 11 have Sewing Machines
 32 have Table Lamps
 44 have Toasters
 5 have Utility Motors
 53 have Vacuum Cleaners
 14 have Waffle Irons
 14 have Warming Pads
 30 have Washing Machines

IN CALIFORNIA—

29 have Air Heaters
 5 have Chafing Dishes
 23 have Curling Irons
 7 have Disk Stoves
 1 has Dishwasher
 1 has Electric Cooker
 9 have Electric Toys
 110 have Flatirons
 19 have Fans
 27 have Floor Lamps
 24 have Grills
 3 have Hair Driers
 2 have Immersion Heaters
 4 have Ironers
 3 have Milk Warmers
 1 has Mixer
 43 have Percolators
 10 have Radio Sets
 1.3 have Ranges
 1 has Samovar
 14 have Sewing Machines
 24 have Table Lamps
 62 have Toasters
 4 have Utility Motors
 66 have Vacuum Cleaners
 18 have Waffle Irons
 20 have Warming Pads
 35 have Washing Machines

years of its existence. No less than 66 vacuum cleaners per hundred wired homes are now used in California, while the number for the eleven Western states as a whole is only slightly below this, being 53.

The toaster and the percolator seem to rank next in the order of their popularity, with 62 and 43 per hundred wired homes in California, respectively, and 14 and 54, respectively, as the number in the eleven Western states.

In any event, the figures demonstrate conclusively that the saturation point is remote, even though the population in the eleven Western states were regarded as stationary instead of increasing, as it is, more than 5 per cent per annum.

The sale of electrical appliances is an effect of the increase in the development of central station power. This is the basis upon which reasonably accurate forecasts may be made as to existing markets and the possibilities of the continuation of such markets in the future. The increase in the number of domestic consumers for central station power in the entire eleven Western states during 1923 was 187,827. The estimated increase for the same type of consumer for 1924 is 196,697, while the total anticipated domestic consumers at the end of 1925 aggregate the imposing figure of 2,093,580. These figures have been carefully estimated and are based upon the curve of increase during the last five years without regard to abnormal building activities in certain sections of the Western country, nor to unusual increases in population.

A survey made by the central stations shows approximately one kilowatt connected for every residential consumer; therefore, outside of the small percentage of penetration shown by the existing load, which in itself offers a market for domestic appliances of great proportions, there is the further market due to the increased connected load for new consumers and newly wired homes that reaches almost unbelievable proportions.

It should not be overlooked at this juncture that there is a great deal more involved in this question of markets than the sale of appliances, for with each such sale is carried a job for the contractor and the sale of wire, conduit, switches, convenience outlets and fixtures of all sorts. The sales possibilities as exemplified by community growth are illustrated in the table following:

	Total Domestic Consumers Dec. 31, 1923	Estimated Increase Domestic Consumers for 1924	Estimated Total Domestic Consumers Dec. 31, 1924
California.....	944,453	123,547	1,068,000
Oregon.....	144,650	13,150	127,800
Washington.....	259,650	33,950	293,600
Idaho.....	45,600	1,300	46,900
Montana.....	41,250	240	41,490
Utah.....	86,100	3,500	89,600
Wyoming.....	22,100	2,350	24,450
Colorado.....	134,800	15,200	150,400
New Mexico.....	16,740	1,240	17,880
Arizona.....	17,900	1,190	19,090
Nevada.....	16,950	1,030	17,980
Total.....	1,700,193	196,697	2,093,580

Generally speaking, it would appear that three classes of prospective buyers offer themselves to electrical industry:

1. That class which already has one or more appliances and which is a prospect for many others.
2. That class which already lives in wired homes, and which has no appliances.
3. That class that is building new homes, which of course will be wired, and that are potential purchasers of appliances.

Unusual interest seems to attach to the exploitation of the electric range. From the viewpoint of the central station, it constitutes a most desirable type of load and when the convenience of electric cooking has been thoroughly presented to the many thousands of potential purchasers there is no doubt but that this appliance will supersede the gas range in practically all of the better class of homes and apartment houses. This appliance is at present in the pioneer stage; the market has scarcely been scratched. With only 1.3 ranges per hundred wired homes in California and only 4.4 in the eleven Western states, this field would appear to offer almost limitless possibilities.

The same markets apply in a large degree to electric water heaters, with 0.8 per hundred wired homes in California and 1.3 per hundred wired homes in the eleven Western states. This market, too, is still in the pioneer stage with its greatest possibilities in the future.

The sales of electric ranges and electric water heaters during 1923 have been tabulated as have also the number of these appliances in use on the lines of central stations, reporting as of January 1, 1924:

Electric ranges in use Dec. 31, 1922.....	35,537
Electric ranges sold during 1923.....	18,000
Electric ranges on lines, Dec. 31, 1923.....	53,537
Electric water heaters in use Dec. 31, 1922.....	14,218
Electric water heaters sold during 1923.....	8,129
Electric water heaters on lines, Dec. 31, 1923.....	22,347

These figures show that only 4.4 per cent of the consumers own electric ranges and only 1.3 per cent of the consumers own electric water heaters.

The sales resistance to the electric range and the electric water heater is two-fold, the first on account of the relatively high first cost as compared to other devices for rendering the same service, and, second, the impression that seems to be prevalent that the operating cost is high. To these might be added a third item, namely, that of lack of familiarity with the operation of these devices and a certain amount of suspicion if not fear of these particular applications of electricity.

These conditions are being gradually overcome. The speed with which they are overcome will depend very greatly on the degree of intelligence shown by the sales methods used, and by the quality of the servicing after installation, with this latter item being one of the most important.

It is astonishing to find, in spite of our boasted superiority in all things electrical, that of the wired homes in California 18.6 per cent have no convenience outlets, while for the eleven Western states 19.4 per cent are in the same condition. It seems incredible that this should be so in a territory that has had relatively small competition from coal and wood for heating. The industry has recognized for a long while that the convenience outlet is almost essential to the satisfactory use of nearly all lamp socket

appliances. It appears, therefore, that much work remains to be done by the industry in selling consistently and persistently the convenience outlet idea. The average number of convenience outlets per home is only six and 37.8 per cent of the total number of homes examined have less than this small average.

An industry so great in its scope as that covering the manufacture and sale of electrical appliances must inevitably become more and more highly specialized as time goes on. Since the market is large enough to justify specialization, great progress is to be expected in the way of improvements in devices with the idea of a greater economy in operation, facility in making repairs and to render them simpler and more nearly fool-proof to suit the average household.

Perhaps the best augury for the future is the tendency on the part of the many diversified interests that go to make up the electrical industry to recognize their interdependability and to discuss their mutual problems with one another. The favorable rates for electrical energy for domestic service that obtain in the West have been one of the chief, if not the chief factor, influencing the increased use of electrical appliances. Lamp socket devices have increased greatly in popularity backed by promotion efforts of the central stations, but the same thing is true of the heavier, more expensive appliances such as ranges, water heaters and air heaters. Special combination rates are made for each. All of the energy used in the home may be purchased through a single meter. The steps or rates of decrease in these rates have been so devised as to stimulate the increased use of electricity by making it possible that the major portion of the energy may be purchased at relatively low cost.

There has been considerable debate on the part of leaders in the industry as to whether electricity should be classed as a necessity or a convenience. For lighting and communication it has come to be practically a necessity, although, speaking literally, it is undoubtedly true that we could burn candles, give up the telephone and revert in a way to the primitive lives of our forefathers. Electric cooking, however, is a convenience that needs only the proper kind of educational work with the housewife in order to bring it into as close an approach to the necessity class as the electric light and the telephone. Competition with gas and oil, especially for the larger homes and apartment houses, is difficult for electrical leaders to combat. On the other hand, the smaller homes would appear to offer the more promising field for the reason that in these homes there is no waste area to speak of, no empty halls or unoccupied rooms to heat, and comparatively small, and in some cases very small, radiation losses.

In any event, the advice given by Horace Greeley to the young man has never been more appropriate than now. The statistics on building operations for 1923 and the prediction that these figures will be increased in 1924 show the Western country and particularly California as the fastest growing section of the United States; indeed, the central stations, the

manufacturers and dealers will have to hustle to keep pace with this growth. Much of the new population is coming from the Middle West, a section of the country where electric lights in many cases are still regarded as very much of a luxury, where the toaster, waffle iron, percolator, vacuum cleaner, and countless other electric servants in the household are practically an unknown quantity. These household conveniences, the facility with which they can be installed, the cheapness of their operation are not the least of the many attractions that the Pacific Coast section offers to those who are coming here to make their homes.

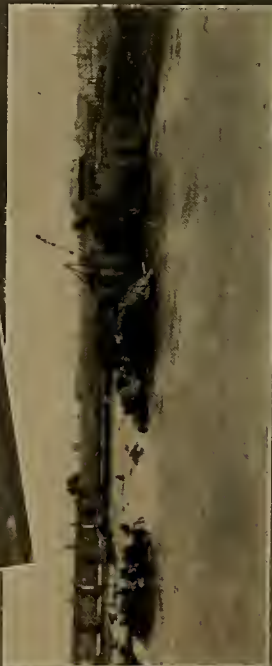
The history of electric rates is showing a steadily downward tendency. The average rates for domestic consumption as well as for industrial and commercial purposes are lower than those for any other section of the country. There is no doubt whatever that the time will come when this Western country of ours will be literally one great electrified industry conducted by those who live in one great electrical home. The length of time this will take will depend entirely on the degree of energy, skill and constructive thought put into this project by those who today make up the electrical industry of the West.

Restoration of Japanese Telegraph System Nearly Completed

Rapid progress has been made, according to the Japanese press, in the re-establishment of telegraph service throughout the earthquake area, stocks of telegraph wire at Osaka and Shibaura being available for immediate use in repairing the damaged lines. The telephone system, on the contrary, has suffered severely and its complete restoration will require at least three years, according to advices to the Far Eastern Division of the United States Department of Commerce.

In the Fukagawa and Honjo wards which were completely devastated by fire, it was found that the underground wires and cables had sustained only a limited amount of damage, so that the restoration of this section will be accomplished in a shorter period than was expected.

The telephone exchanges at Koishikawa, Aoyama, Ushigome and Yotsuya, serving altogether about 20,000 telephone users, have been reopened since Sept. 29. These four exchanges were saved from the conflagration, though the Yotsuya office was badly damaged. The telephone authorities expect to open a big exchange in a central section of the city this spring, increasing the number of phones by about 10,000. This is, however, a makeshift arrangement, the permanent measures for a complete restoration of the communication system having been left for determination after the main city reconstruction program is settled. At the same time it is said that the manual system hitherto used will be supplanted by an automatic system. The Department of Commerce reports that an unusual opportunity exists in Japan at the present time for the introduction of American-made automatic telephone equipment.



MAJOR Western hydroelectric plants finished in 1923. Reading from top to bottom the plants are: (left) Powderdale, Pacific Power & Light Company; American Falls, Idaho Power Company; (right) Big Creek No. 3, Southern California Edison Company; Don Pedro, Modesto-Turlock Irrigation District; El Dorado, Western States Gas & Electric Company.

Survey Shows 1924 Will Be Record Year for Hydroelectric Development

HYDROELECTRIC projects in the West completed during 1923 involved a total of 143,325 kw. while those which will be completed during 1924 will add 251,600 kw. to the lines of the companies serving this rapidly growing territory. In round numbers the 1923 program represented an expenditure of \$58,800,000 while the 1924 construction will represent an estimated expenditure of \$103,000,000 for additional generating capacity, including plants, transmission and distribution equipment.

With the 138,675 kw. made available during 1922, the average annual increase in hydroelectric capacity during the three-year period, 1922-4 inclusive, is 177,663 kw. or at the rate of approximately 10 per cent a year on the basis of an installed hydroelectric capacity of 1,857,500 kw. at the end of 1923. In the case of California alone the average annual increase over a three-year period has been 116,075 kw. or at the rate of 12 per cent on an installed hydroelectric capacity of 967,500 kw. Dec. 31, 1923. Should this percentage of increase hold for the next five years, the installed hydroelectric capacity of the West at the close of 1928 would be approximately 3,000,000 kw. while that of California would be slightly in excess of 1,700,000 kw.

It is reasonable to believe that the increase in population and industrial activity in those states west of the Rocky Mountains during the next five years will equal if not eclipse that of the past. Already one company in California is making plans for serving 6,000,000 people within the next ten years in a territory where it now serves but 2,000,000.

The increase in steam generating capacity during the past year has been almost negligible. There have been a few plants completed in the Pacific Northwest. However, there are planned for the coming year several notable installations. These include a 70,000-kw. plant for the Southern California Edison

Company at Long Beach; the initial unit of 25,000 kw. in a new plant for the Los Angeles Gas & Electric Company; a 20,000-kw. plant for the Utah Power & Light Company at Salt Lake City; a 20,000-kw. unit in a plant which will have an ultimate capacity of 200,000 kw. for the Public Service Company of Colorado at Boulder and a 5,000-kw. plant for the Mountain States Power Company at Coos Bay, Ore. The present installed steam capacity for the eleven western states is 716,125 kw. while that for California alone is 410,000 kw.

The past twelve months have witnessed some notable additions to the hydroelectric generating stations of the West, chief among which is the Big Creek No. 3 plant of the Southern California Edison Company on the San Joaquin River. This station has an initial capacity of 75,000 kw. and an ultimate capacity of double this figure. The Edison company's program also included the installation of a third 16,000-kw. unit in Big Creek No. 1. The Modesto-Turlock Irrigation District completed a 15,000-kw. station at Don Pedro dam on the Tuolumne River in California in connection with its irrigation project. The Western States Gas & Electric Company also completed its 20,000-kw. El Dorado plant on the American River.

In the Mountain states the Utah Power & Light Company added the fourth 11,000-kw. unit to its Grace plant in Idaho, while the Idaho Power Company has completed the installation of two 6,000-kw. units at its American Falls plant on the Snake River. The only station of any size to be completed in the Pacific Northwest during the past year was the Powerdale plant of the Pacific Power & Light Company near Hood River, Ore. This plant has a capacity of 6,000 kw.

A survey of hydroelectric projects under way during 1923 or definitely scheduled for 1924 is contained in the following table:

Name of Company	Plant	Location	Present or Proposed Installation kw.	Ultimate Capacity kw.	Static Head (ft.)	Present Stage of Development
British Columbia Electric Railway Company	Stave Falls (fifth unit)	On Stave River near Vancouver, B. C.	18,000	18,000	110	Construction nearing completion. Plant to be in service Oct. 1, 1924.
British Columbia Electric Railway Company	Alouette	Near Stave Lake, B. C.	9,000	9,000	140	Awaiting Government approval.
Puget Sound Power and Light Company	White River (fourth unit)	Dieringer, Wash.	16,000	57,000	440	Plans completed and equipment ordered.
City of Seattle	Gorge Creek	105 mi. N. E. Seattle	35,000	480,000	278 (Initial) 375 (Ultimate)	First unit 88 per cent complete.
City of Tacoma	Cushman	North Ford of Skokomish River, Wash.	36,000	101,000	140 (min.) 260 (max.)	Ready for bids on dam and tunnel. Plans and specifications for power house and equipment being prepared. Plant to be in service January 1, 1926.
Pacific Power & Light Company	Powerdale	Near Hood River, Ore.	6,000	6,000	180	Completed May 15, 1923.
City of Aberdeen (Wash.)	Wynooche	Wynooche River, Wash.		20,500		Bond issue of \$2,000,000 for this development passed December 1, 1923.

Name of Company	Plant	Location	Present or Proposed Installation kw.	Ultimate Capacity kw.	Static Head (ft.)	Present Stage of Development
Washington Water Power Company	Long Lake (fourth unit)	Long Lake, Wash.	17,400	70,000		Equipment delivered. In service 1924.
Washington Water Power Company	Similkameen (second unit)	Oroville, Wash.	1,600	3,200		Completed, 1923.
Idaho Power Company	American Falls	American Falls, Idaho	12,000	27,000	50	Two 6,000-kw. units put in service, one each in December 1923 and January, 1924.
Montana Power Company	Mystic Lake	Mystic Lake, near Columbus	10,000	10,000	1,050	One-third completed. Plant to be in service by end of 1924.
Utah Power & Light Company	Grace (fourth unit)	Grace, Idaho	11,000	44,000	525	Fourth unit added and put in service in 1923.
Utah Power & Light Company	Soda Springs	Bear River, near Alexander, Idaho	14,000	14,000	78.5	Plant 50 per cent completed. To be in service July, 1924.
Mountain States Power Company	Albany Hydro	Albany, Ore.	1,000		34	To be completed March, 1924.
Mountain States Power Company	Big Fork Hydro	Big Fork, Mont.	1,700		110	Construction started early in 1924.
Deschutes Power Company	Cove (second unit)	Crooked River, near Culver, Ore.	875	2,150	31	Work 10 per cent completed.
Portland Railway, Light & Power Company	Oak Grove	Upper Clackamas River, Ore.	30,000	90,000	922	First unit to be in service summer 1924.
City of Eugene (Ore.)	McKenzie (new unit)	McKenzie River, Ore.	1,500		50	To be in service early in 1924.
The California Oregon Power Company	East Side	Link River, Klamath Falls, Ore.	3,200	3,600	47	Work recently started. Finish by July, 1924.
Pacific Gas & Electric Company	Pit No. 3	Pit River, Calif.	81,000	81,000	313	Estimated completion date Oct. 1, 1925.
Western States Gas & Electric Company	El Dorado	American River, near Placerville, Calif.	20,000	60,000	1,900	In service January, 1924.
Great Western Power Company	Caribou (third unit)	Feather River, Calif.	24,000	96,000	1,008	To be completed early in 1924.
Modesto-Turlock Irrigation District	Don Pedro	Tuolumne River, Calif.	15,000	35,000	130-260	Completed in 1923.
Yuba Development Company	Bullard's Bar	Yuba River, Calif.	7,500	15,000	175	Plant to be put in service summer of 1924.
City of San Francisco	Moccasin Creek	Near Jacksonville, Calif.	70,000	105,000	1,315	Fifty per cent complete. Scheduled for service late in 1924.
Merced Irrigation District	Exchequer	Merced River, 35 mi. east of Merced, Calif.	25,000		300 (max.)	Preliminary work done. Construction may start any time.
San Joaquin Light & Power Corp.	Power House No. 3	North Fork San Joaquin River, Calif.	1,800	4,200	400	Plant capacity increased from 2,400 kw. to 4,200 kw. in 1923.
San Joaquin Light & Power Corp.	Balch	Kings River, Calif.	31,000	115,000	2,495	Roads, camp and transmission line built. Scheduled for service in 1926.
Southern California Edison Company	Big Creek No. 1 (third unit)	Big Creek, near Cascada, Calif.	16,000	73,000	2,131	Third unit put in service July, 1923.
Southern California Edison Company	Big Creek No. 1 (fourth unit)	Big Creek, near Cascada, Calif.	25,000	73,000	2,131	Work to be started early in 1924.
Southern California Edison Company	Big Creek No. 3	On San Joaquin River, in California, near junction with Big Creek	75,000	150,000	830	Completed October, 1923.
Southern California Edison Company	Big Creek No. 2 (fourth unit)	Big Creek below Plant No. 1	16,000	64,000	1,858	Work to be started early in 1924.
San Geronio Power Company	No. 1	San Geronio River, Calif.	1,650	1,650	1,789	Completed December, 1923.
San Geronio Power Company	No. 2	San Geronio River, Calif., below Plant No. 1	775	775	913	Completed January, 1924.
Southern Sierras Power Company	Leevining Creek No. 3	Leevining Creek, Mono County, Calif.	2,500	2,500	384	Completed December, 1923.
Southern Sierras Power Company	Leevining Creek No. 1	Leevining Creek, Mono County, Calif.	12,500	12,500	1,682	Forty per cent completed.
Southern Sierras Power Company	Owens River	Owens River Gorge, Mono County, Calif.	7,500	7,500	240	Active construction just begun. Five per cent completed.
Southern Sierras Power Company	Forest Home	Mill Creek, near Redlands, Calif.	2,250			Construction under way. To be completed in 1925.
Southern Sierras Power Company	Rush Creek No. 3	Mono County, Calif.				Construction work recently started.
Salt River Valley Water Users Association	Roosevelt Power Plant	Roosevelt Dam, Ariz.	7,500	16,000	100 to 240	Twenty-five per cent completed. To be in service in 1924.

Western Transmission Lines Completed in 1923 and Projected for 1924

Name of Company	Voltage in Kv.	No. Circuits	Supporting Structure	Length in Miles	Location	Present Stage of Construction
Montana Power Company	50	1	Single pole	26.7	Mystic Lake to Red Lodge, Mont.	Completed 1923.
Montana Power Company	50	1	Single pole	26.9	Sheridan to Dillon, Mont.	Completed 1923.
Montana Power Company	50	1	Single pole	22	Havre to Chinook, Mont.	Projected for 1924.
Washington Water Power Company	60	1	Single pole	50	Coulee City to Chelan, Wash.	Completed 1923.
Washington Water Power Company	110	1	Three pole	6	Mullan Junction to Burke, Idaho	Completed 1924.
Idaho Power Company	132		Wood pole	29	Caldwell to Ontario, Idaho	Completed June, 1923
Puget Sound Power & Light Company	110	1	Steel and wood pole	121	Dieringer to Wenatchee, Wash.	Completed 1923.
British Columbia Electric Railway Company	34.6	1	Wood pole	28	Vancouver to Britannia Beach, B. C.	Completed 1923.
City of Seattle	165	1	Twin wood pole	105	Skagit plant to Seattle, Wash.	To be completed 1924.
Pacific Power & Light Company	66	1	Wood pole	62	Pasco, Wash. to Pendleton, Ore.	To be completed 1924.
Portland Railway, Light and Power Company	57	1	Wood pole	19	Bull Run Plant to Lents Substation, Ore.	Completed 1923.
Portland Railway, Light and Power Company	57	1	Steel tower	18	Oak Grove Plant to Cazadero, Ore.	To be completed 1924.
Northwestern Electric Company	66	1	Single wood pole	17.6	Camas to Vancouver, Wash.	Completed 1923.
Mountain States Power Company	66	1	Single wood pole	19.4	Alhany to Independence, Ore.	Completed 1923.
The California Oregon Power Company	60	1	Single wood pole	20	Line extension north of Klamath Falls, Ore.	Completed 1923.
The California Oregon Power Company	60	1	Single wood pole	6	Dixonville to Roseburg, Ore.	Completed August, 1923.
Pacific Gas and Electric Company	220	2	Steel towers for each circuit	9	Pit 3 Plant to Pit 1 Line at Hayne's Meadows, Calif.	To be completed late in fall of 1924.
Pacific Gas and Electric Company	110	2	Steel tower	25	Cooley Landing to Martin Station, Calif.	75 per cent complete. In service early in 1924.
Pacific Gas and Electric Company	110	2	Steel tower	30	Lake Chahot to Oakland-Newark Line, (Calif.)	50 per cent complete. In service 1924.
Great Western Power Company	165	1	Steel tower	12	Valona Substation to Golden Gate Substation, (Calif.)	Completed 1923.
Truckee River Power Company	60	1	Wood pole	31	Washoe Plant in Nevada to Summit, Calif.	Completed 1923.
Western States Gas & Electric Company	66	1	Steel pole	9	El Dorado Plant to Camino Tap, (Calif.)	Completed 1923.
City of San Francisco	120 or 154	2	Steel tower	200 to 240	Moccasin Creek to San Francisco, Calif.	To be constructed in 1924.
San Joaquin Light & Power Corporation	110	2	Steel tower	22	Balch Plant to Piedra, Calif.	One circuit completed Nov. 15, 1923.
San Joaquin Light & Power Corporation	70	1	Wood and steel	77	Buttonwillow to Santa Maria, Calif.	Completed 1923.
San Joaquin Light & Power Corporation	70	1	Wood pole	13	Dairyland to LeGrande, Calif.	Completed Feb. 12, 1923.
Southern California Edison Company	220	2	Steel towers for each circuit	240	Big Creek to Eagle Rock, Calif.	Changed from 150 kv. to 220 kv. in 1923.
Southern California Edison Company	220	2	Steel towers for each circuit	30	Eagle Rock to Laguna Bell Substation, (Calif.)	Completed 1923.
Southern California Edison Company	220	1	Steel tower	270	Big Creek to Eagle Rock and Laguna Bell Substations, (Calif.)	To be started in 1924 for use in 1926. Third Big Creek circuit.
Southern Sierras Power Company	88	2	Wood pole	100	El Centro to Warner's Ranoh, Calif.	To be completed in 1924.
San Diego Consolidated Gas & Electric Company	66	2	Wood pole	9	Del Mar to Escondido, Calif.	To be completed Spring, 1924.
San Diego Consolidated Gas & Electric Company	88	2	Wood pole	17	Escondido to Rincon, Calif.	To be completed Spring, 1924.
Utah Power & Light Company	44	1	Single wood pole	28	Springville to Helper, Utah	Completed 1923.
Utah Power & Light Company	130	1	Twin wood pole	9.5	Grace Station to Soda Station, Idaho	Completed 1923.
Utah Power & Light Company	44	1	Single wood pole	56.5	Kenilworth to Sunnyside and Columbia, Utah	Completed 1923.
Public Service Company of Colorado	90		Steel tower	35	Boulder Canon to Denver, Colo.	To be built in 1924.

Physical Aspects of the Pacific Coast Interconnected System

TWO important events influencing the development of an interconnected system serving the entire Pacific Coast occurred during the past year. One was the advent of 220,000-volt transmission on the lines of the Pacific Gas and Electric Company and the Southern California Edison Company, both of which are important links

in the California interconnected system. The other was the closing of the gap at Wallace, Idaho, which existed between the lines of the Washington Water Power Company and the Montana Power Company, thereby throwing the resources of this latter company, which is one of the largest in the West, into the system which covers the Pacific Northwest.

Two hundred twenty thousand volt transmission has a particularly important bearing upon any discussion of interconnection for the exchange of large blocks of power. It is recognized by engineers that if power is to be transmitted economically over distances ranging between 250 and 500 miles this voltage is the minimum that can be employed. Consideration of the development of both the Colorado and Columbia Rivers, where the large blocks of power generated must be transported a considerable distance to markets, must include provision for 220,000-volt transmission.

A survey of the present interconnected system shows that there are two small gaps which must be closed before the lines covering California and southern Oregon can be joined with those covering Washington, Idaho and Montana. The construction of a 66,000-volt line from Albany to Independence, Ore., by the Mountain States Power Company, leaves a small gap of 18 miles between the latter point and Salem, which is served by the lines of the Portland Railway, Light & Power Company. It will be necessary to make this connection before the southern system can be linked with that serving the lower Columbia River region. Theoretically the gap is much smaller. The lines of the Oregon Electric Railway Company, which operate at 33 cycles and which are connected with those of the Portland Railway, Light & Power Company at Portland through frequency changers, parallel those of the Mountain States Power Company for a considerable distance south of Salem. Could this difference in frequency be overcome, interconnection would be simple. Again, the Southern Pacific Company, which operates an electric railway south of Portland, has a transmission line which originates at Salem, where energy is

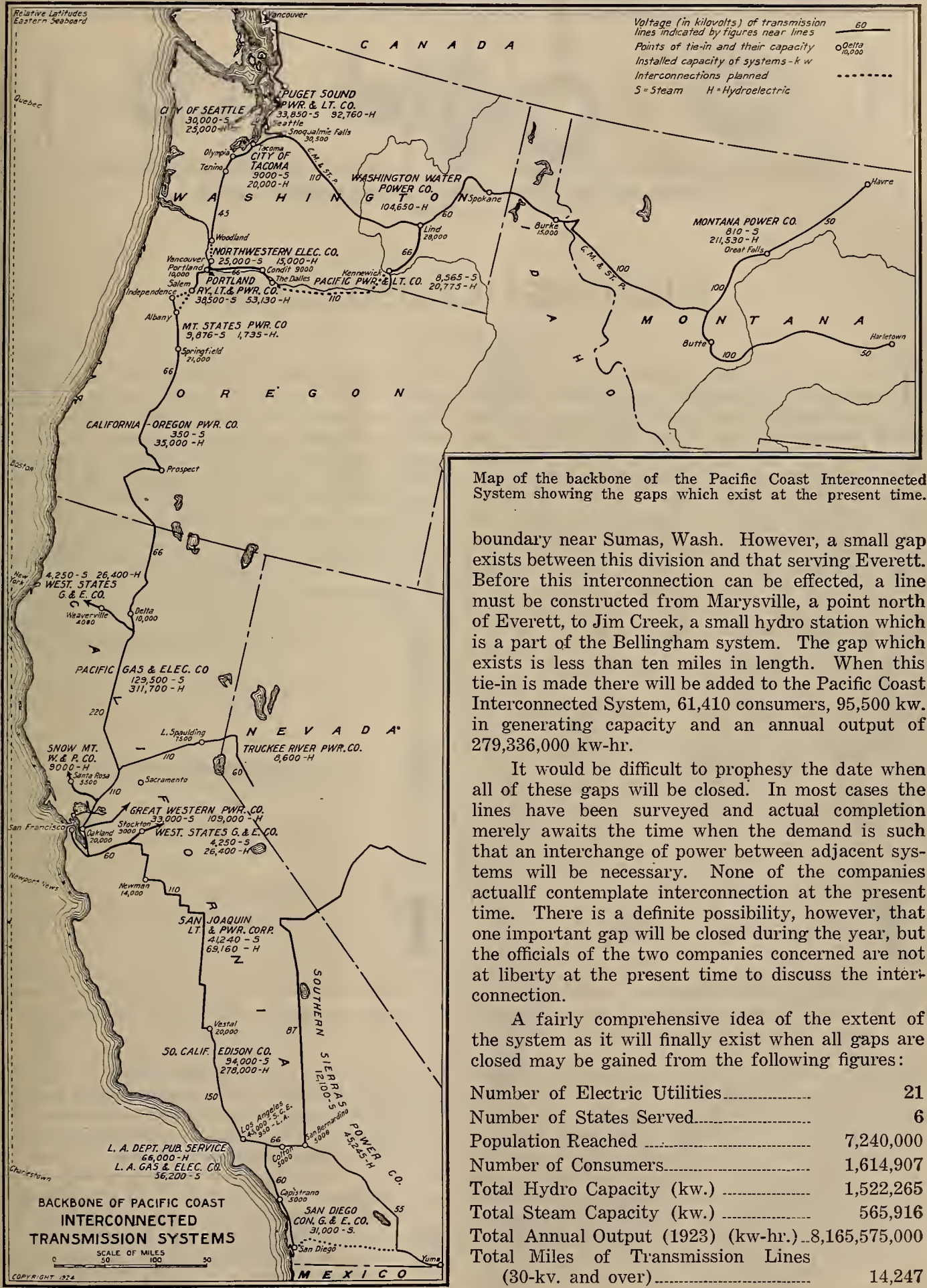
A survey of the Pacific Coast Interconnected System shows that two small gaps, one in Oregon and the other in Washington, remain before complete tie-in of the lines serving California, Oregon, Washington and Montana can be effected. With these gaps closed a system that has no parallel in any part of the world would then exist.

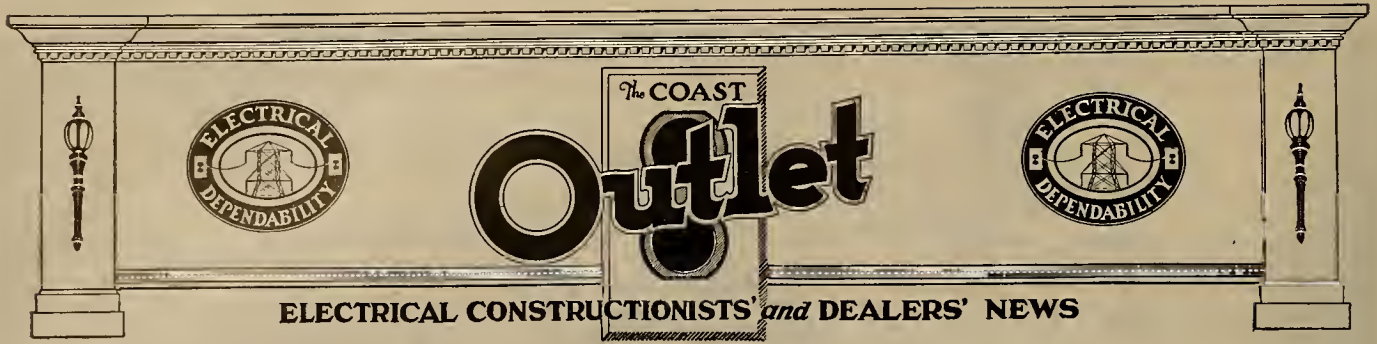
purchased from the Portland Railway, Light & Power Company, and extends through Independence, now served by the Mountain States Power Company. Theoretically interconnection could be effected at Independence. However, the requirements of electric interurban railway service are such that the commercial interchange

of power over this line would not be practical.

Between the central stations serving the lower Columbia River territory and those comprising the Northwest interconnected system there are two possible courses of tie-in. Eastward along the Columbia River there is a long gap extending from The Dalles to Umatilla between the two systems of the Pacific Power & Light Company. This company proposes to close this gap at some date in the future. The most practical course is northward from Vancouver, Wash., along the line of the Northern Pacific Railroad. A small gap which previously existed south of Olympia between Tumwater and Tenino has been closed by the Puget Sound Power & Light Company, tying-in its North Coast Power properties with those forming a portion of the interconnected system covering Washington and Montana. The southern end of the North Coast properties is Kalama, a point on the Columbia River. South of Kalama there is a low-voltage line, the property of the Washington-Idaho Water, Light & Power Company, which extends to Woodland. The Northwestern Electric Company has an 11,000-volt line from Vancouver to Ridgefield, a small city five miles south of Woodland. Thus it is seen that the only physical gap between the Columbia River group of companies and the interconnected system is that between Woodland and Ridgefield, a distance of approximately five miles. Before the commercial interchange of power would be possible, however, it would be necessary to construct at least a 60,000-volt line from Vancouver to Kalama, a distance of about 30 miles. With this gap closed and an interconnection effected between Salem and Independence, Ore., the Pacific Coast interconnected system would then be complete.

Reference is often made to an interconnected system extending from the Canadian to the Mexican borders. Before such a system would be possible, a small gap must be closed between the Everett and Bellingham divisions of the Puget Sound Power & Light Company. The Bellingham division is interconnected with the lines of the British Columbia Electric Railway Company, Ltd., at the international





Electrical Construction

By E. Earl Browne

THE size, type and location of motor circuit switches to be furnished and installed under the usual electrical specification furnished the electrical contractor are not clearly defined and as the usual "Joker" clauses are always present which say that "the contractor must do the work according to all state, local and underwriters' rules and must furnish everything to make a complete job even if not

with time limit overload protection or a double throw switch which shunts the motor running overload protective device for these smaller motors and a switch to disconnect the starting device is not required (See Fig. No. 1, also 1920 edition, National Electrical Code, p. 21, 2nd paragraph, and 1923 National Electrical Code, p. 84, rule 1003-i), but where auto-starters are used a switch is demanded by the

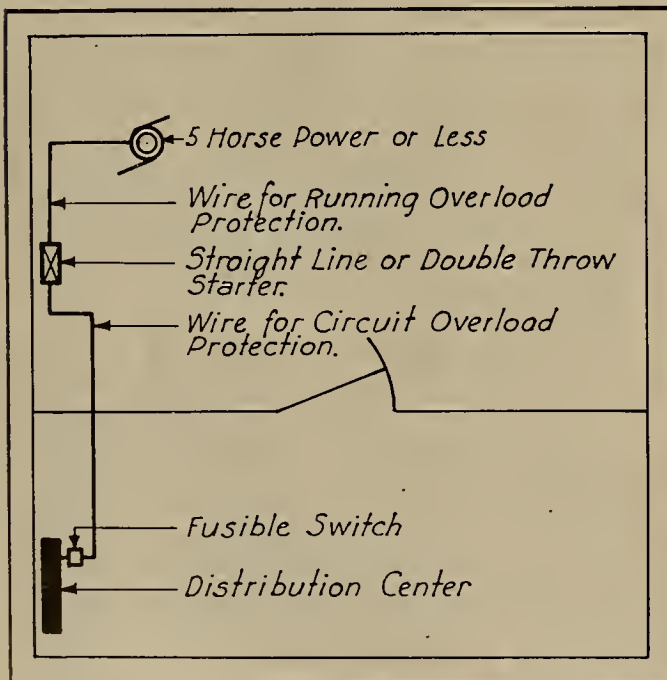


Fig. 1—Proper switching for motors not started with auto-starters where motor is within sight of starter.

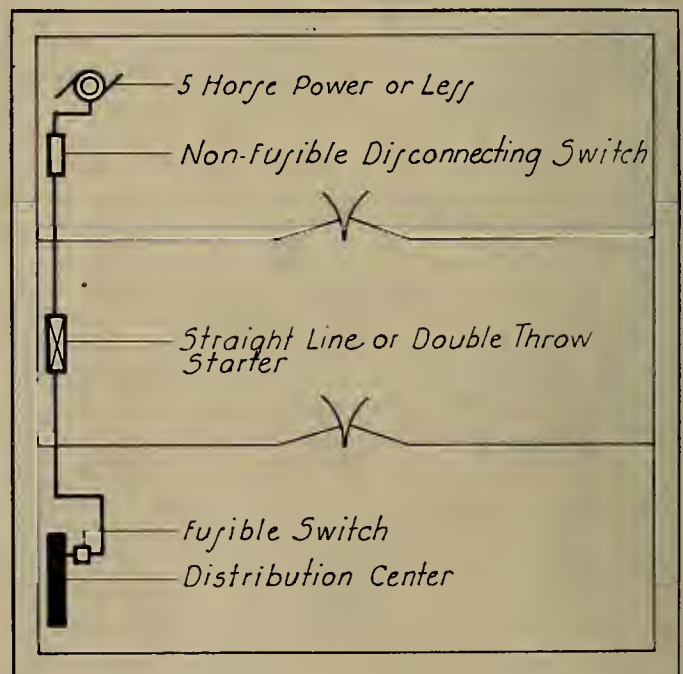


Fig. 2—Same as Fig. 1 except motor is not within sight of starter.

specifically called for," it behooves the careful estimator to keep several basic facts in mind when figuring on this class of construction.

The National Electrical (Fire) Code does not demand a switch at the distribution center ahead of the "circuit overload protection" cutouts, but as nearly all state and municipal inspection departments demand these for life hazard reasons it has become almost universal practice to use the combined device. As most of the power companies do not demand the use of an auto-starter on motors of 5 hp. and less it is usual to provide a "straight line" type of starter

above-mentioned rules and rule 1003-n of the 1923 code requires that it be of the same ampere capacity as the wire between the auto-starter and motor. This switch can be of the non-fusible type as it is provided merely as a disconnect switch in order to work on the motor or auto-starter or machinery with a feeling of safety. Where the motor is in a location that is not within sight of the man operating the starter, as per Figs. 2 and 4, an additional switch is usually required for the same reason as cited above, as it is natural for a man to take a chance if a trip downstairs is necessary to lock the auto-starter dis-

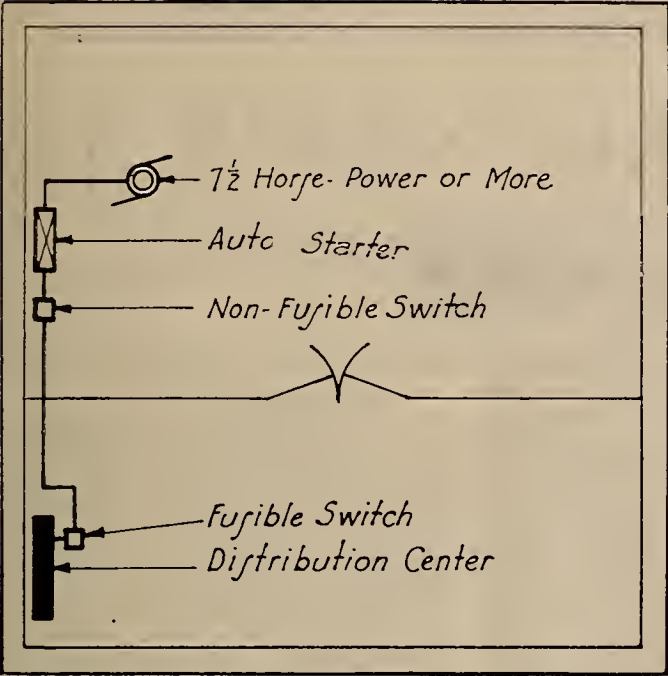


Fig. 3—Proper switching for motors started with auto-starter where motor is within sight of starter.

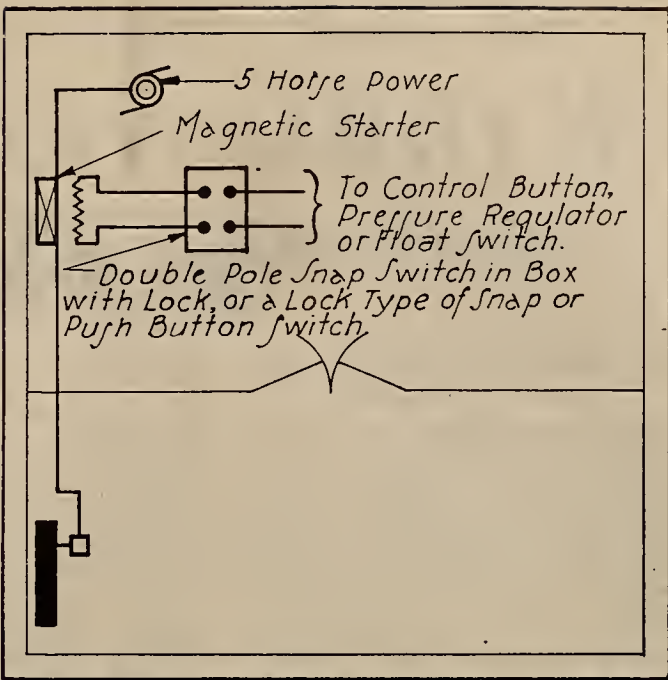


Fig. 5—Magnetic starter installation on small motors with locked push or snap switch in control lines.

connect switch open. Where magnetic starters are installed in connection with motors not requiring an auto-starter, either a disconnect switch should be installed ahead of the starter (Fig. No. 6) or a push button or snap lock switch can be installed in the control lines (Fig. No. 5) and if the motor be not

Nearly all elevator machinery companies desire to do all work in plant house or elevator machinery room in connection with their controllers and motors. It is, however, necessary that a disconnect switch be installed near the machinery and this must be furnished by the electrical contractor. This is an

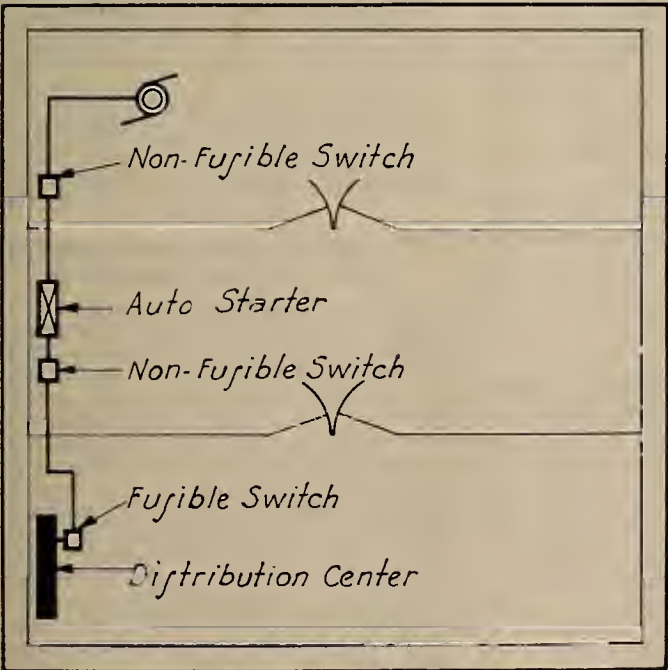


Fig. 4—Same as Fig. 3 except motor is not within sight of starter.

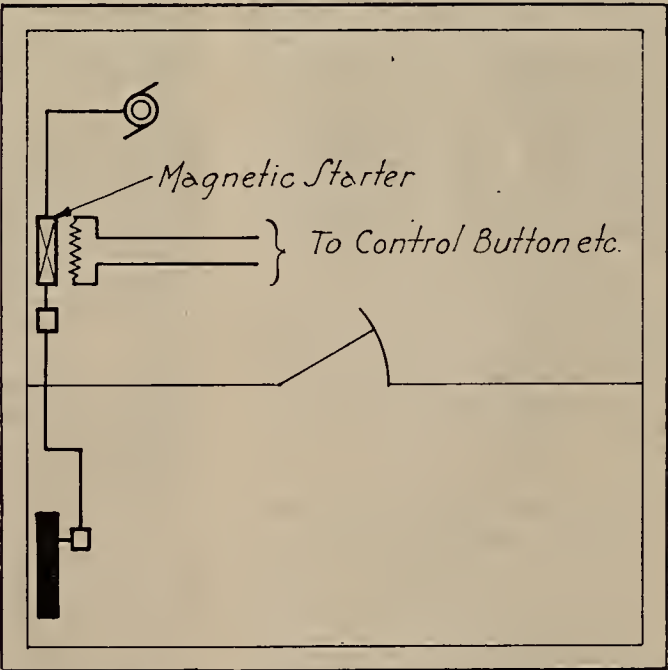
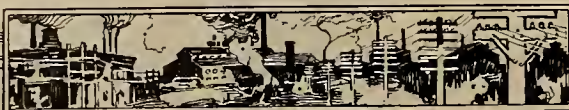


Fig. 6—Same as Fig. 5 except safety switch is installed ahead of starter instead of a switch to disconnect control lines.

within sight of the starter, as for instance a deep-well pump with float switch control on roof and magnetic starter in engine room, then an additional disconnect switch should be installed at motor as per Fig. No. 4.

arbitrary understanding as, of course, there must be a well defined line drawn between the end of the electrical contractor's work and the beginning of the elevator contractor's installation. An arrangement can be made to suit both contractors.

INDUSTRIAL NEWS



Los Angeles Evaluation Payment Halted by Petitions

Expenditure of \$50,000 to be paid to the California State Railroad Commission for securing an evaluation of the electrical properties of the Los Angeles Gas & Electric Corporation has been halted by the filing of referendum petitions, bearing 58,766 signatures, with the city clerk of Los Angeles, Calif. The petitions compel the city council to either place the resolutions, calling for the payment to the Railroad Commission of \$5,000 for work done and for \$45,000 for future evaluation work, before the voters for their sanction or the repeal of the measures.

Some weeks ago the same alternative was placed before the council when a sufficient number of signatures was secured to halt the city from paying the Railroad Commission \$25,000 as part payment for the evaluation work. At that time the council repealed the \$25,000 measure and passed the two resolutions calling for the expenditure of \$50,000.

The last petitions were filed with the city clerk by the Los Angeles Gas & Electric Corporation. That concern suggested that the number of voters who signed the petitions be checked only to the amount that it would be necessary to have the matter come up at the general election. As only 10 per cent of the registered voters' signatures are necessary to get the measures on the general election ballot, the city would be saved the expense of a special election, which would be necessary if 15 per cent of the registered voters were ascertained to have signed the petitions.

The two measures passed by the Los Angeles council were inaugurated at the request of the Municipal Bureau of Power and Light. The purpose is to secure an evaluation of the private corporation's properties in order that they may be condemned by the city.

Seattle Electro-Chemical Power Rate Before Council

Twenty-five dollars per kilowatt year is the rate fixed for electro-chemical power, by the provisions of an ordinance introduced in the city council at Seattle, Wash., recently and referred to the finance and city utilities committees.

By the terms of the bill "electro-chemical power" is held and construed to mean power used solely for the purpose of manufacturing chemical products by users whose minimum load is 1,000 hp. or more. The bill further provides that the superintendent of lighting be authorized to contract with users of electro-chemical power for the furnishing thereof for any period not exceeding 25 years, in such amount and

upon such terms and conditions governing the delivery thereof as he shall deem to be for the best interest of the City of Seattle. There is a provision that no power shall be contracted to be furnished in excess of the hydroelectric capacity of the units of the municipal power plant and system already operating, or those the construction of which has been authorized by the city council. In the event that such capacity shall at any time be insufficient to meet the demand for electro-chemical power, the priority of the date of the contract shall govern the furnishing of such power, and the same shall not be prorated among all applicants.

This is the second change in power rates within a month, the council passing a bill two weeks ago, fixing the rate for what is known as "waste power" at one mill per kilowatt-hour. Both changes are in the interest of industrial development.

One-Third of Normal Snowfall Now on Sierra Nevadas

Approximately one-third of the normal snowfall for this time of the year is now on the Sierra Nevada Mountains in California, according to United States weather bureau reports. At Summit, on Jan. 28 there were 33 in. of snow. Snowfall gage records show that in normal years 100 in. of snow were on the ground at that time.

It is the opinion of many power company men that the condition may be regarded as serious. The problem is somewhat simplified by the fact that in the past it has been found that 50 per cent of the precipitation is recorded during the month of February.

Mountain States Company Plans Work on New Power Plant

According to A. L. Martin, manager of the Mountain States Power Company, Albany, Ore., work will be commenced not later than Feb. 15 on the proposed new steam power plant at North Bend, Ore. The plant, which will cost approximately \$600,000 and develop 6,700 hp., will be erected in the center of the Stout Lumber Company's mills.

Refuse from both mills will be used as fuel and oil stored at the company's nearby gas plant can also be drawn upon in emergency. In addition, the company plans to build two large scows on which fuel can be carried from adjacent mills on Coos Bay.

The California-Oregon Power Company has applied to the Public Service Commission of Oregon for permission to raise its light and power rates, effective as of Feb. 1.

Colorado Power Company Wins: Right to Raise Rates

In a decision handed down by Federal Judge J. Foster Symes the Colorado Power Company, Denver, Colo., has been accorded the right to raise its rates from 20 to 40 per cent for power supplied mining companies and small municipalities in the northern part of the state on its central system.

The application for increases and for permission to cancel certain contracts was first made to the Colorado Public Utilities Commission in December, 1919, and finally denied in April, 1923. The judge ruled that the rates to which the commission sought to hold the company were confiscatory on the valuation of its holdings on its central system, as arrived at in the federal court, and placed the present valuation at \$9,613,325.94, as against the \$4,211,460 set by the commission. The company claimed a valuation of over \$11,000,000. Judge Symes held that under the commission's rates the power company was denied a fair return on its investment, and that during the four years since the application was first made it had suffered an irreparable and confiscatory damage by the commission's refusal to grant the increase.

The court ordered that the company continue to supply power to consumers under contract, holding that the company was to blame if it was losing money at the stipulated contract rates.

First Unit of New Plant Begun by Los Angeles Company

The Los Angeles Gas & Electric Corporation, Los Angeles, Calif., has purchased eight acres of land at Seal Beach, on the east side of Alamitos Bay inlet, Calif., as a site for a steam power plant. According to A. B. Day, superintendent for the company, work has already started on the first unit, which will generate 44,000 hp. and is expected to be put in operation in the summer of 1925. The cost is estimated at \$3,500,000.

The entire plant, which when completed will consist of six units, will be of steel and concrete construction, costing ultimately about \$15,000,000. The generators will be driven by steam turbines, and an order has already been placed with the Westinghouse Electric & Manufacturing Company for the first generator, which it is said will be the largest in operation west of Chicago. Natural gas and oil will be used as fuel. The proposed use of water from the ocean for cooling purposes was one of the main considerations that led to the selection of the site purchased.

The power generated will be transmitted 25 mi. direct to Los Angeles over 110-kv. transmission lines.

Nineteen Permits Are Issued by California Water Board

Nineteen permits to appropriate water within the State of California were issued during the month of December, 1923, by the Department of Public Works, Division of Water Rights of that state. Only one of the permits issued covers hydroelectric projects of appreciable importance. This permit was issued to the Pacific Gas and Electric Company.

The permit grants the appropriation of 50 sec.-ft. of water from North Battle Creek in Tehama County. The company proposes to develop 2,722 hp. at an expense of \$25,400.

Thirty-seven applications for permits were filed with the department during the same month. The largest hydroelectric project is covered in an application filed by Fred P. Tuttle, Jr., of Auburn. The application states that the proposal is to develop 107,000 hp. at power houses to be erected in Placer and El Dorado Counties. Permission to appropriate 1,200 sec.-ft. and 200,000 acre-ft. of water from the North and Middle Forks of the American River and from the Rubicon River is requested. The estimated cost of the development is \$18,654,000.

The City of Los Angeles and the Board of Public Service Commissioners of that city have applied for two permits to appropriate water. The first application covers a project in Mono County where by using 56 sec.-ft. and 9,000 acre-ft. of water from Rock Creek and 14 sec.-ft. and 5,500 acre-ft. from the East Fork of Rock Creek, it is proposed to develop 12,300 hp. The estimated cost of this project is \$1,705,350. The second application proposed the appropriation of 20 sec.-ft. and 18,966 acre-ft. of water from Baker Creek and Sanger Meadows Fork of Baker Creek in Inyo County to develop 9,646 hp. This project would be used in connection with the Big Pine Creek project of the city. It is proposed to construct 4.9 miles of concrete lined ditches and tunnels. The estimated cost of the development is placed at \$750,000.

Largest Budget Since 1913 Made by British Columbia Utility

The British Columbia Electric Railway Company is planning an expenditure during 1924 of \$5,250,000, on additional power plants and equipment around Vancouver, B. C.

At the Stave Falls plant there will be installed a fifth generator and the four existing generators will be re-wound and the turbines readjusted to increase the output of power, taking advantage of the increased head of water since the dam was raised. The output of power from this plant will be increased from 36,000 kw. to 54,000 kw. at a cost of \$1,000,000. It is expected this work will be completed by November, 1924.

On the Alouette Lake project adjacent to Stave Lake, \$760,000 will be spent in 1924, and a further \$1,385,000 to complete this development in 1925. The power plant which will be situated at the mouth of the tunnel between Alouette Lake and Stave Lake will generate 9,000 kw.

An additional high tension line will be built between Stave Falls and Vancouver and the present high tension

lines will be increased in size so that the capacity of the lines will be trebled. Two of the high tension lines between the Lake Buntzen plants and Vancouver will be increased in size and wood pole lines partly replaced by steel towers. The total cost of these high tension improvements is \$563,000.

Additional substation and transformer equipment in and around Vancouver will call for an expenditure of \$421,000. An automatic substation in Vancouver is among the items proposed.

Additional high tension switches and gear for power plants and substations will cost \$265,000 and the finishing of the work on the Blind Slough dam will represent \$90,000.

A 12,000-volt power line, mostly underground, will be built to encircle the industrial section of Vancouver from Horne Payne receiving station to Haro Street substation, via the waterfront and back to Main Street substation via False Creek. This will feed the elevators, docks and mills direct from the receiving station and thus relieve the city substation. At the same time a start will be made on placing the power lines in the down town section underground. The scheme will ultimately cost \$500,000. The expenditure on these matters this year will be \$304,000.

On Vancouver Island the company is planning new high tension lines between its Jordan River plant and Victoria. On the company's railway system there will be spent \$600,000 on track work and rolling stock.

This is the largest budget of expenditures the company has made since 1913. George Kidd, president of the company, intimated recently that arrangements were in progress to issue approximately \$4,000,000 in additional securities in London. Mr. Kidd left the beginning of February for England to discuss matters with the directors of the company.

Seattle Municipal Railways Placed on Warrant Basis

Commencing Jan. 10, the municipal railway system of Seattle was placed on a warrant basis for four months in order to divert daily receipts to the bond redemption and interest fund account to take care of annual redemption payments falling due March 1. At that time, according to a statement of the city treasurer, there will be a deficit in that fund of \$400,000, due to loans made to the operating fund last spring and summer to cover losses sustained by the system when the five-cent fare was in effect.

Plans have been made to retire warrants to the amount of more than \$375,000 monthly so that each bi-monthly issue will be retired before the end of the four-month period.

R. H. Ballard, vice-president and general manager of the Southern California Edison Company, Los Angeles, Calif., at a recent meeting of the City Club of Los Angeles, declared emphatically that there was no shortage of hydroelectric power imminent in Southern California, and stated that plans of his company call for the development of power sufficient to serve 6,000,000 consumers instead of the 2,000,000 now served.

Outline Construction Program for San Diego Utility

New construction and improvements contemplated by the San Diego Consolidated Gas & Electric Company for 1924 call for a budget of approximately \$2,600,000, according to statements made by company officials recently. Though less than the 1923 expenditures by nearly a million dollars, it is pointed out that many improvements were made to that company's system last year that will not have to be duplicated for some time. Sufficient generating capacity and substation improvements were made to take care of San Diego's growth for another year, it is felt by the company's officials.

Of the 1924 improvements, aside from numerous gas plant enlargements, the major electric activity of the San Diego Consolidated Gas & Electric Company will be in connection with the Southern Sierras Power Company tie-line to Imperial Valley. It is estimated that \$200,000 will be spent by the San Diego company to build a substation at Escondido to care for this tie-line and to build a line from the Escondido substation to Rincon to connect with the Southern Sierra Power Company's lines.

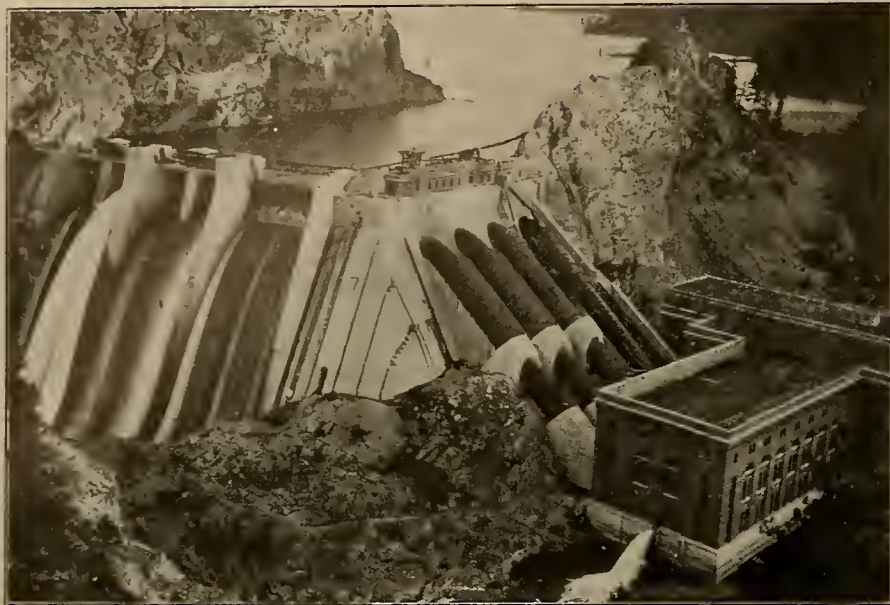
In electric production the San Diego Consolidated Gas & Electric Company will make only minor changes, since last year saw the completion of the installation of a 15,000-kw. unit and five B. and W. boilers. A 5,000-kw. turbo-generator will be moved to a new location in that company's Station B to allow for future installation of another 15,000-kw. unit when needed. All direct current generators formerly driven by steam turbines in this same station will be given motor drive and several improvements to pumping and auxiliary apparatus will be made.

Station C, the show place of the company's system, a semi-residential district substation of artistic architectural design, will receive few changes, but it is contemplated that plans for a future "Station D" to serve further residential territories north and east of the park in San Diego will be prepared during the year.

The electric repair shop, under process of construction, will be finished and put into use within the next few months, it is planned. Equipped with all test facilities, transformer platforms and latest equipment, this shop is to be one of the most modern on the coast.

The San Diego Consolidated Gas & Electric Company also expects to move its commercial offices into the building acquired by it last year and renamed the "Electric Building." Commercial offices are now being prepared on the ground floor, and it is declared by officials of the company that they will compare with any bank of the city for appointments and equipment. Pneumatic tubes, telephone and dictaphone connections to the other offices of the company on the second, third and eighth floors of the building will be the latest in design and efficiency. High speed elevators are also being installed to replace those formerly in the building.

Citizens of Pasadena, Calif., on Jan. 10, 1924, approved the issuance of bonds to the extent of \$250,000 for light and power extensions.



Long Lake Power House of the Washington Water Power Company in which a fourth unit is added. The new penstock is at the extreme right.

Work on Long Lake Plant Fourth Unit Nearly Completed

Construction work on the fourth unit of the Long Lake plant of the Washington Water Power Company is rapidly nearing completion. The unit that is being installed is rated at 23,500 hp. and will bring the total capacity of the plant up to 94,000 hp. The total cost of the Long Lake plant, which is located on a narrow gorge on the Spokane River, will be brought to about \$6,000,000 by the installation that is nearing completion.

Considerable difficulty was met by the engineers of the Washington Water Power Company in getting materials and equipment to the power house. The plant is located seven miles from the nearest railroad and all material had to be hauled over an abandoned railroad grade. The equipment that has been installed in the plant was delivered at Ford, Wash., and from that point was hauled by a tractor attached to a specially constructed trailer.

Deliveries of the generator equipment and water wheel parts began early last November and it was necessary for the tractor to make 16 trips during that month to haul the heavy parts to the power plant. The total weight of the water wheel parts was 117 tons, of which the shaft and two runners

amounted to 37 tons. This was the heaviest load hauled by the tractor, the total weight being 50 tons as the trailer itself weighed 13 tons. The generator parts weighed 222 tons. The lower half of the stator frame weighing 33½ tons was the heaviest single load hauled while the generator parts were being transported. It took the tractor an entire day to make the seven-mile trip when the heavier loads were hauled.

Power Company Plans Expansion of Elwha River Plant

The Northwestern Power and Manufacturing Company, a corporation of Wilmington, Del., has applied for the right to divert 1,300 sec.-ft. of water from the Elwha River, near Port Angeles, Clallam County, Wash. The water will be used to supply another unit which the company plans to add to its hydroelectric plant already in operation on the Elwha River.

The company proposes the construction of a reinforced concrete dam, 15 ft. high and 180 ft. long, to impound the water, and a canal 3½ mi. long to carry it to a power plant for the additional development of 20,000 hp. Work would be commenced about Jan. 1, 1925. The cost is estimated at \$1,600,000.



Part of the water wheel assembly being transported from Ford to the power house. The heaviest load totaled 50 tons

Electrical Exhibit Entered in Denver Women's Pageant

One of the features of the recent pageant ball of the Denver (Colo.) Women's Press Club is said to have been the spectacular display of the Electrical Cooperative League of that city.

Preceding the ball a costume pageant and parade was participated in by over a thousand people representing various organizations, characters, and periods of American history. Electricity came in for its share of honor, according to reports, through the league display of a small self-propelled electric truck on which was enthroned the electrical queen, portrayed by Miss Janette Edwards.

The color scheme was entirely in black and white with small 2-cp. lamps embedded in the decorations. Over 400 lights were required on the truck and Miss Edwards' costume. A large sign with the name of the organization was placed on each side of the truck.

Members of the Denver league advisory board who arranged the novel display were Harry D. Randall, R. G. Gentry and Dean D. Clark. According to reports, a considerable amount of effective publicity was secured for the electrical industry, both at the pageant and in the Denver newspapers.

Baker River Site Applied For by Puget Sound Company

The Puget Sound Power & Light Company of Seattle, Wash., has applied for permission to divert 4,000 cu. ft. of water from the Baker River, a tributary of the Skagit River, in order to construct a hydroelectric power plant and reservoir, to be known as the Baker River Water Power Development, Eden Site.

Stone and Webster, Inc., will have charge of the engineering work which will be begun Sept. 30, 1924, if the permit is granted, and will be completed in two years. The plant will cost approximately \$3,500,000 and will be designed to develop 65,000 hp.

Hetch Hetchy Water Issue Voted Paramount to Power

The Down Town Association of San Francisco, Calif., recently adopted the following resolution relative to that city's municipal water and power project: "Resolved, That the Down Town Association is in favor of completing the bringing of water from Hetch Hetchy to San Francisco, and that the bringing of water is paramount to the distribution of power in San Francisco."

The association also expressed its full confidence in the present Board of Supervisors, "their integrity, honesty of purpose and their desire to serve the best interest of the whole people of San Francisco."

A test of the Lake Cushman power project dam was recently made by means of a model dam and an apparatus for applying hydraulic pressure to it. The results as announced by Ira S. Davidson, commissioner of the Tacoma, Wash., municipal light and power department, show that the dam as designed will be at least twenty times as strong as necessary to withstand the pressure of the impounded water.

San Francisco Supervisors Vote to Start Evaluation

Proceedings to submit two large Hetch Hetchy bond issues to the people of San Francisco, Calif., were started at the meeting of the Board of Supervisors of that city on Jan. 21. At the same time the supervisors passed a resolution calling on the California State Railroad Commission to make an evaluation of the San Francisco electrical distributing systems of the Pacific Gas and Electric Company and the Great Western Power Company.

The action taken by the supervisors recalls the eight weeks' postponement of the request for an evaluation that was passed at a meeting two weeks previous. As a result of the most recent action, the Railroad Commission will be called upon immediately to make a survey of the value of the two distributing systems. The valuation will be fixed for condemnation purposes.

The two bond issues tentatively call for a total issue of \$39,000,000. Twenty-four million dollars of this, according to present plans, will be used in completing the 48 miles of tunnel necessary to bring the Hetch Hetchy water supply to San Francisco. The other issue, for \$15,000,000, is planned to be used in building or purchasing an electrical distribution system in the city. The date of the bond issue is to be announced within three weeks.

Robert Searls, special counsel, has recently announced that it is his opinion that money from the original Hetch Hetchy bond issue cannot be used for paying the costs of evaluating the two San Francisco distributing systems. This issue was voted by the people of San Francisco in 1910 and was for the city's water system and power necessary to pump the water over the mountains. Mr. Searls pointed out that the supervisors might appropriate the necessary funds from the city's general fund.

Index to Volume 51 Ready for Distribution

The index to Volume 51, pages 1-472, of the Journal of Electricity has been compiled and is now ready for distribution. The index contains a completed listing of all items appearing in the magazine from July 1, 1923, to Dec. 15, 1923, inclusive.

Copies of the index will be supplied without cost to subscribers upon application. Those desiring to secure copies of the index should address the Circulation Manager of the Journal of Electricity, 883 Mission Street, San Francisco, Calif.

San Diego Club Asked to Attend Los Angeles Banquet

Announcement that the Electric Club of San Diego, Calif., had been invited to attend the annual banquet and dance to be held by the Los Angeles Electric Club at the Biltmore Hotel on Feb. 2 was made at the Jan. 15 meeting of that organization. Invited as the special guests of the Los Angeles organization, which visited the San Diego club last summer, practically all of the San Diego club members who can get away are planning to make the trip north.

S. F. Forbes, Pacific Coast manager of the Fairbanks-Morse Company, gave

the San Diego Electric Club an historical survey of the electrical development and possibilities of the western states, at the same meeting. Reviewing the three epochs of the West, the discoveries, the coming of first civilization, and the third and greatest epoch, that of electrical development, Mr. Forbes predicted untold possibilities for growth.

A number of guests attended this meeting of the club, one of the largest in attendance in club affairs. H. G. Folsom, of the J. A. Roebling's Sons Company, Los Angeles office, Stanley Forbes, Los Angeles manager of the Fairbanks-Morse Company, Lieutenant Friedman of the Naval Air Station, Paul D. House, Electric Products Corporation, Los Angeles, Fred Fermin, Mission Beach Company, and Miss Frances Sherman, who urged support of high school auditorium bonds, were among those present at the meeting.

Christmas Parties Are Held for Puget Sound Employees

Two Christmas parties of large size were held during the last holiday season for the employees of the Puget Sound Power & Light Company. The first of these was held in Seattle, Wash., Dec. 18, when approximately seven hundred children were entertained.

At this meeting, which was attended by the southern district employees and their children, A. W. Leonard, president of the company, and Mrs. Norwood W. Brockett, wife of the vice-president and



A. W. Leonard and Mrs. Norwood W. Brockett impersonating Mr. and Mrs. Santa Claus.

general manager, acted as Santa Claus and Mrs. Santa Claus, much to the delight of the guests at the party. Presents were given to each child that attended the party.

The second Christmas gathering was held at Bellingham on Dec. 22. Mr. Leonard also appeared as Santa Claus at that time and from the base of a large Christmas tree passed presents to the three hundred children assembled for the occasion. Nearly all of the employees of the northern division of the company were present at the party.

Washington Water Power Co. Plans Improvements

According to plans outlined, the Washington Water Power Company, Spokane, Wash., contemplates making improvements during 1924 to the extent of about \$2,000,000. Included in the major items is the construction of a new 110,000-volt transmission line to the west from the Long Lake power station, joining the existing western lines at Stratford. Upon completion of this line, the line running north and south from Coulee City and Stratford to Neppel, which was originally built for ultimate use at 110,000 volts but for temporary use at 60,000 volts, will be changed to its maximum capacity.

The company also plans the construction of a line from Neppel to Taunton, connecting there with the high tension intermountain line to the west, which now serves the Chicago, Milwaukee & St. Paul Railway. This will furnish duplicate high tension service to the substations supplying power to Creston, Wilbur, Almira, Hartline, Coulee City, Stratford, Neppel, Ephrata and Quincy.

Another new line running south from a point east of Spokane into the Palouse country to reinforce the existing lines in that territory is also contemplated. An additional transmission line from Long Lake to Spokane is under consideration, which would make the fourth high tension circuit there. The plans also comprise bringing the excess power from the Similkameen plant, near Oroville, Wash., upon its completion, into the general distribution system of the company, either by reinforcing the present line through the Okanogan Valley or constructing an additional line.

The Washington Water Power Company, of Spokane, Wash., has completed the installation of a 2,150 hp. water wheel at the Similkameen Power House at Oroville. James McNair of the engineering department has supervised the construction work. In order to make final tests, the following men left Spokane for Oroville on Jan. 16: R. L. Hearn, assistant chief engineer, Eugene Logan, civil engineer, John A. Tobyn, operating engineer, all of The Washington Water Power Company, and Major B. L. Eaton, erecting engineer for Wm. Cramp & Sons Ship & Engine Building Corporation. The water wheel was made by the Pelton Water Wheel division of Wm. Cramp & Sons, and the generator by the General Electric Company. A test made on Jan. 18 was entirely satisfactory.

Officers for the year 1924 have been elected by the Electrical Contractors' and Dealers' Association of San Francisco. Edward Martin, of the Sterling Electric Company, is the new president; George Smith, of Smith Electric Company, is vice-president, and E. Earle Browne, of Browne-Langlais Electrical Construction Company, is recording secretary. The new executive committee is composed of Walter R. Mobley of the American Electrical Engineering Company and Victor Lemoge, retiring president. Felix Butte, of the Butte Electric Equipment Company, is Central Council representative, with T. De Pass serving as alternate.

Sacramento Valley Association Meets at Substation

The Sacramento Valley Electrical Society met at 6:30 on Jan. 9, at the Vaca-Dixon substation of the Pacific Gas and Electric Company, located between Dixon and Vacaville, Calif., on the Sacramento-Oakland highway. President H. E. Willis presided. This meeting was the first ladies' night ever held by the society and 250 persons were in attendance. The ladies of the Dixon Community Council prepared the dinner. Music during the evening was furnished by the Pacific Gas and Electric Company orchestra.

Don C. Ray, manager of the bureau of public relations of the Pacific Gas and Electric Company and acting as the personal representative of R. E. Fisher, vice-president in charge of public relations and sales, gave an address of welcome to those present. Captain C. S. Nussbaum, secretary of the Dixon Chamber of Commerce, spoke for that organization and its work in the community. R. A. Balzari, chairman of the "Smiles" committee of the Pacific Coast Electrical Association, spoke on the Courteous Service Club drive to be carried on within the entire electrical industry. In order to create enthusiasm within the Sacramento Valley Electrical Society during the campaign, R. T. Stephens and Roy N. Phelan were appointed captains of competitive teams to secure members. M. J. Mulholland sang two solos and also led the group singing.

A number of slides and a reel of moving pictures of the Pit River development of the Pacific Gas and Electric Company were shown, and Mr. Mulholland told of this development work. An opportunity was afforded everyone to inspect the substation. Following this inspection trip a classical dance was given by four girls from the Dixon Union High School and the remainder of the evening was devoted to dancing.

Third Annual Radio Exposition to Be Held Feb. 6-10

The third annual radio exposition will be held in Los Angeles, Calif., Feb. 6-10, at the Biltmore Hotel. It will be conducted by the American Radio Exposition Company of New York, which was formed several years ago for the purpose of holding annual radio expositions in different parts of the country.

A wide assortment of equipment will be exhibited. The Los Angeles Chamber of Commerce and the Southern California Radio Association are co-operating to make the event a success. Arrangements are in charge of J. C. Johnson, local representative of the exposition company, with offices at Room 707 Bank of Italy Building, Los Angeles.

Washington Sales Department Is Entertained at Banquet

At a banquet held at the Davenport Hotel, Spokane, Wash., recently, the Washington Water Power Company of Spokane entertained its sales department, in appreciation of the records made this year in the sales of electrical merchandise. As compared with 1922, sales for 1923 were nearly doubled.

Lewis A. Lewis, sales manager, presided and gave a short review of the work done during the past year, his talk being followed with a statement of

the plans for the coming year, outlined by his assistant, R. B. McElroy. J. E. E. Royer, assistant to the general manager, expressed the interest taken by the management in electrical merchandise as a revenue builder, and described the plans for betterments to be executed during 1924. J. F. Farquhar, in charge of district sales, told of the sales results obtained in the territory served by the company.

The banquet was attended by 30 guests, representing the sales department of Spokane, the only out-of-town member being H. I. Klehm, district agent of Ephrata.

The Pacific Coast broadcasting station of the General Electric Company, located at Oakland, Calif., was opened to the public for inspection on Jan. 21. The station was visited by a large number of invited guests between the hours of 10 a.m. and 10 p.m. on that day. The new broadcasting station, known as KGO, is sending out radio programs on Tuesday, Thursday and Saturday nights of each week.

"The Illuminator," an illustrated magazine of eight pages, made its first appearance in January. This is the new company publication of The Washington Water Power Company, Spokane, and while every employee is invited to contribute, the Department of Public Relations will act as managing editors. The magazine will be sent free to each full time employee of the company.

The El Dorado hydroelectric plant of the Western States Gas & Electric Company on the American River, Placer County, California, was placed in service Jan. 15. The plant that has been placed on the lines contains two horizontal units each of 10,000-kw. capacity. The opening of the plant was delayed two weeks by the bursting of the steel penstock the first time that it was filled with water.

The Delta Electric & Water Company, of Everett, Wash., has received permit from Marvin Chase, Washington supervisor of hydraulics, for the installation of a hydroelectric power plant on Pilchuck Creek in Snohomish County. The proposed development will cost \$200,000 and will provide for a 550-hp. plant, with a concrete arch dam, 70 ft. high and 317 ft. long on top.

Woman Has City Electrician's Examination Certificate

Electricity invaded woman's domain, and now a woman retaliates by invading electricity's domain. Mrs. Louise B. Green, of San Diego, won the distinction of being the first woman to be granted the master electrician's certificate for the city, when she passed the examination with high honors before City Electrical Inspector A. E. Johnstone, recently.

Mrs. Green, a widow, inherited her husband's electrical supply business. City ordinances require that each such establishment have connected with it a master electrician. When Mrs. Green continued to have difficulty to hire a master electrician for the business she determined to fill the place herself. Mrs. Green passed the municipal examination, said to be a very thorough one, to the satisfaction of the city electrician and so now fills the master electrician vacancy herself.

Electric and Steam Locomotives Entered Tug-of-War

Two important tests were recently made with the electric locomotive manufactured by the General Electric Company and the American Locomotive Company for the Mexican Railway Company, Ltd.—a tug-of-war and a regeneration test. In the tug-of-war a steam locomotive of the Mikado type, with practically the same weight on drivers as the electric unit and equipped with booster, superheater and all other improvements, was used. Manned by a picked crew, it was coupled to the electric unit and, at a given signal, each engineer applied power in opposite directions and attempted to pull the other. The steam machine was allowed to get a start and the electric locomotive then slowed it up, stopped it and finally pulled it in the opposite direction. The victory of electricity over steam was, in practically all cases, decisive.

In the regenerative tests, the same steam locomotive was coupled to the Mexican unit which was pulled along the rails in simulation of a down grade. The steam locomotive exerted its maximum power and a speed of about 14 m.p.h. was attained. About 1,800 hp. was sent back into the system, but it was estimated that two steam locomotives of the same type would be required to return full power to the line.



One hundred and fifty-ton, 3,000-volt electric locomotive built for the Mexican Railway Company, Ltd., pulling against a Mikado type steam locomotive.

Sacramento Electrical Men Are Dinner Guests of Union

One hundred and ten men of the electrical industry of Sacramento, Calif., met in the dining room of the Hotel Land in that city on the evening of Jan. 23 as the guests of the members of Electrical Workers, No. 340. The meeting was in the form of a dinner followed by speeches from men of the industry and was the first one where electrical workers, contractor-dealers, jobbers and power company men were all in attendance to discuss the subject of cooperation.

Cooperation—the subject upon which every speaker based his talk, was heartily commended by everyone in attendance. Interest in the meeting was evidenced by the fact that over eighty members of the Sacramento union were present and every member of the Electrical Contractors' and Dealers' Association had one or two representatives there.

Henry Tilsen, president of the Sacramento union, acted as toastmaster at the meeting. A. H. Feely, business agent of the organization, was the first speaker of the evening and told of the union's idea of cooperation and of the reasons for the union men suggesting the meeting. C. V. Snyder, Electric Supply Company and president of the contractor-dealers' association, expressed the gratitude of the contractors upon being able to meet their employees in such a way and J. C. Hobrecht, J. C. Hobrecht Company, in a short address told the men at the meeting of the benefits that could be secured from cooperation.

As part of the educational entertainment provided for the meeting, an illustrated talk, dealing with the obstacles that are met by power companies in supplying uninterrupted service and of the work of the system dispatcher, was presented by F. R. George of the Pacific Gas and Electric Company. Following this, Mr. George presented moving pictures showing some of the hydroelectric developments of the Pacific Gas and Electric Company.

Arthur E. Rowe, of Garnett Young & Company, San Francisco, was the principal speaker of the evening. Mr. Rowe in an exceptionally interesting talk told how cooperation was the thing to be aimed at by everyone in the industry, and that selling the firm was one of the best methods in which the firm's employees could evidence their cooperation. He told that the Courteous Service Club of the Pacific Coast Electrical Association was built upon the idea of cooperation and urged everyone at the meeting to join the club.

Investigation of Boiler House Economies Made in Denver

Boiler house economies is a subject of special consideration of the engineers of the western division of the Public Service Company of Colorado, according to a recent report from the office of Charles A. Semrad, manager of the division.

A new 600-hp. boiler with six zone forced draft stokers has just been placed in service at the Cheyenne, Wyo., steam plant and final adjustments are waiting the completion of the coal and ash handling equipment.

Experiments at the Lafayette, Colo., plant have proved the economy of a new

firing system in conjunction with the use of a frequency changer to handle the railroad load. A change has also been made in the Mason forced draft regulator by building up the sliding cam until the desired angle was obtained which would give the slowest cutting-out and the fastest cutting-in of the air pressure.

The Pacific Gas and Electric Company has announced plans for the reconstruction of the lighting system and for other improvements in Oroville, Calif., amounting to approximately \$100,000. The work contemplated includes replacing practically every pole and street light and almost complete re-wiring, construction of a new reservoir and new mains.

Books and Bulletins

TECHNICAL WRITING

By T. A. RICKARD, Associate of the Royal School of Mines, formerly Editor of the "Engineering and Mining Journal," "The Mining Magazine," and the "Mining and Scientific Press." Contributing Editor of the "Engineering and Mining Journal-Press." Formerly State Geologist of Colorado. Lecturer at the Universities of Harvard, Columbia, McGill, Stanford and California. Second Edition. 337 pages, 5 by 7½ in. Cloth. \$2. Published by John Wiley & Sons, Inc., New York, N. Y.

The average engineer has one characteristic for which he is often justly criticised; his use of the English language, whether in writing or in public speaking, is lamentable. As an exemplar of a profession based on accuracy and efficiency, he employs words—one of his most important tools—inaccurately and inefficiently.

In his four lectures upon which this book is based, Mr. Rickard aimed to call attention to this fault at its source,—the university. The result has been immediate. The book is employed in the engineering departments of universities and colleges where there is yet an opportunity to impress upon the minds of technical students the importance of writing coherently, concisely and correctly. But its application has not stopped here. Those engineers, who have realized the necessity for precision of language, have found the book immeasurably helpful in correcting the faulty English which limited their expression.

It is difficult to say whether Mr. Rickard is primarily an editor or an engineer. Without doubt, there is no one better qualified than he to write such a book. Eighteen years of experience as a mining engineer and twenty-three as an editor have furnished him with a backbone of observation and practice that is admirably reflected in his book.

The second edition has been largely rewritten. Chapters on the subjunctive, "shall and will," on punctuation and on "The Wrong Word" have been added, thereby rounding out the subject more fully than before.

Included among the more important chapters are those on clearness and pre-

cision, the relative pronouns, construction, composition and style. A chapter is also devoted to superlatives.

The book is notably concise, clear, practical and direct in contrast to other texts on English composition. It can be unquestionably recommended to those students of engineering who realize that a knowledge of English and the ability to write terse reports, to state facts plainly and to convey information intelligently, are worthwhile and profitable accomplishments.

PRACTICAL CONTROL OF ELECTRICAL ENERGY

By ALFRED GEORGE COLLIS. 160 pages. 142 figures. Published by Henry Frowde and Hodder & Stroughton (Oxford Technical Publications).

British practice in the control of electrical machinery is treated in this book in that it contains descriptive technical data covering the design of electrical apparatus manufactured in England. According to the author it is his intention to present in the most concise form simple data and principles with the object of explaining and solving alternating and direct current problems without the introduction of complicated equations and formulas.

The first chapter of the book is devoted to a description of the terms of expression used in explaining electrical phenomena, to which twenty-six pages are devoted. Electrical indicating and measuring instruments as well as the various systems of connections as ordinarily used in generation and distribution are treated in the second chapter, covering thirty-six pages.

The third chapter, to which thirty-nine pages are allotted, is in the opinion of the reviewer the most valuable one in the book and is a fairly thorough treatment of the application of protective devices. English practice in the use of protective gear, as it is termed, is treated in sufficient detail to give a good idea of the use and value of such devices. The protection of generators and high tension cable against internal faults is treated almost exclusively. Some reference is made to American practice but the application of protective relays to high tension overhead transmission networks as used in the United States has very little space devoted to it.

Miscellaneous electrical apparatus covering power house equipment such as oil circuit breakers, direct current machine, alternating current motors, field regulators, and switchboards are covered in the next chapter of forty-seven pages and a final short chapter is devoted to notes on factory and mining regulations.

In a book of this size the space available does not permit of sufficient detailed treatment of the subjects covered. Consequently, some important subjects such as oil circuit breakers, for example, are not treated as thoroughly as their importance in the control of electrical energy justifies. The diagrams are sufficiently clear for purpose of description but it is to be regretted that more photographs are not included in the book. Several folding plates showing detailed wiring diagrams of switchboards and electrical machines, illustrating typical schemes of connections, add to the value of the book.

E. R. S.

Meetings

Marysville Electric Club Holds Dinner and Meeting

The newly organized Electrical Development Association of Marysville, Calif., held its first get-together dinner at the Western Hotel, in that city, on Jan. 8. The attendance was practically 100 per cent and the meeting was notable for its enthusiasm and for the cooperative spirit which was evidenced.

Dinner was served at 6:30 and George W. Roberts, president of the association, acted as toastmaster. During the dinner there were several impromptu speeches by various members and guests. Oliver E. Sholders, sales engineer of the Pacific Gas and Electric Company, San Francisco, Calif., spoke on the attitude of that company toward the contractor-dealer and of the support which the company can give to cooperative dealer movements. Short addresses were made by George Young, of Marysville, C. F. Berg, of Marysville, Burton Y. Gibson, Pacific Coast representative for Walker & Pratt Manufacturing Company, and by Fred A. Peck, superintendent of new business for the Pacific Gas and Electric Company, Marysville. A short address was given by George W. Barker, associate editor of the Journal of Electricity, on merchandising and on the value of cooperative sales efforts.

This association will hold monthly dinner meetings and has mapped out constructive plans for the betterment of merchandising conditions in the territory covered by its members, particularly with reference to standardization of installation requirements and conditions.

To Hold A.I.E.E. Convention at Philadelphia Feb. 4-8

The mid-winter convention of the American Institute of Electrical Engineers will be held at the Bellevue-Stratford Hotel, Philadelphia, Pa., Feb. 4-8. The convention delegates will celebrate the fortieth anniversary of the founding of the Institute at that time.

In addition to the regular technical sessions which will be held in the mornings, afternoons and evenings, a number of trips have been planned for the visitors. At the evening meeting on Feb. 4, the Edison Medal for meritorious achievement in electrical science, electrical engineering or the electrical arts, will be presented to John W. Lieb, vice-president, New York Edison Company and the 1923 winner of the medal.

Electrical Demonstration Given Before Portland Meeting

An electrical demonstration was staged at the members' forum of the Portland, Ore., Chamber of Commerce as a celebration of the 200th anniversary of Benjamin Franklin's birth. It took the form of the artificial production of lightning—discharging into the jar electrical flashes of high frequency and of between 500,000 and 1,000,000 volts. This was identical with the demon-

stration staged by Charles P. Steinmetz.

The actual production of the lightning was in the hands of Walter Haynes, dean of the school of electrical engineering of the Y.M.C.A. He was assisted by D. W. Proebstel, operating inspector of the Portland Railway, Light & Power Company, and Harry P. Cramer, of the electrical engineering staff of the same company. A novel feature of the exhibition was a demonstration of just how Benjamin Franklin made his electrical discovery when he brought the lightning down from the sky during a heavy thunder storm by means of a kite and a key.

Banquet Held by San Francisco Contractor-Dealers

Nearly two hundred and fifty men and women were in attendance at the annual banquet of the Electrical Contractors' and Dealers' Association of San Francisco, Calif., held at Tait's at the Beach in San Francisco on the evening of Jan. 26. Guests at the banquet, in addition to members of the association and their wives, included representatives of San Francisco jobbers, manufacturers' representatives, manufacturers and power companies. A number of Oakland and Sacramento people were also present.

The banquet was conducted upon strictly informal lines, the Pagoda being reserved for the party. Entertainment was provided during the serving of the dinner and following this the evening was devoted to dancing.

During one of the intermissions Arthur E. Rowe, as a representative of the association, presented the association's tokens of esteem to Victor Lemoge, retiring president, and to Albert Elkins, retiring secretary. Both of the men who were honored by the association made short talks thanking their associates for the gifts.

COMING EVENTS

American Institute of Electrical Engineers—
Mid-winter Convention—Philadelphia, Pa.
Feb. 4-8, 1924

New Mexico Public Utilities Association—
Annual Convention—Albuquerque, N. M.
Feb. 18-20, 1924

The annual convention of the New Mexico Public Utilities Association will be held at Albuquerque, N. M., Feb. 18, 19, 20, according to an announcement just issued by the secretary, Charles E. Toogood of that city. The meeting will be held in the new million dollar hotel, the Franciscan. Plans are being made to entertain about fifty visitors. E. A. Bradner, manager of the Las Vegas Light & Power Company, is the retiring president.

During the month of January Norwood W. Brockett, vice-president of the Puget Sound Power & Light Company, Seattle, Wash., addressed the Spokane Rotary Club and also the Associated Engineers on the subject of the Erickson Bill. The two meetings were well attended by representative business men, and Mr. Brockett's searching analysis of the weaknesses of this so-called "Enabling Act" was very well received.

Duplicate Franklin's Experiment at Los Angeles Meeting

On the anniversary of Benjamin Franklin's birth, there were several meetings staged in Los Angeles, Calif., in honor of his memory, two of the principal ones being at the Grauman's Metropolitan Theater at 10 a.m. and another at the Biltmore Hotel at a luncheon of the Chamber of Commerce.

The meeting at Grauman's Metropolitan Theater was arranged through the cooperation of the Southern California Edison Company and the General Electric Company, with Arthur L. Spring of the General Electric Company and Mr. Peterman of the Southern California Edison Company in charge.

At this meeting there was a demonstration arranged, duplicating Benjamin Franklin's kite experiment. For this demonstration, a large kite was placed high over the stage and a cord leading out into the audience with a key attached at the end. Artificial lightning was produced and transmitted through the rod on the kite down to the key, causing a spark which was distinctly noticeable to the audience.

In introducing the above demonstration, Mr. Spring spoke as follows:

"Benjamin Franklin played a very important part in the early development of electricity. Some of his theories of that time are today accepted as established facts. He was one of the first to contend that lightning and electricity were one and the same thing and decided to prove this. In June, 1752, he flew his kite with a pointed wire at the top and a key at the lower end of the string. With the equipment which we have here we are going to perform Franklin's kite experiment. When Franklin brought his knuckle near the key a spark made its appearance. This proved that lightning and electricity were one and the same thing. With this fact established, Franklin set about to find a way to protect buildings from lightning and so invented the lightning rod.

"Today artificial lightning is made in the laboratory. In the research laboratory of the General Electric Company at Pittsfield lightning bolts of 2,100,000 volts are hurled at will and these experiments today are playing an important part in the development of high voltage transmission of electrical energy.

"Little did Benjamin Franklin realize that the industry, in the early history of which he played such an important part, would become so vital a factor in modern civilization. Think of it—the automobile, the airplane, the street car, the telephone, the telegraph and even radio are all dependent upon this subtle fluid which lights our homes and turns the wheels of industry."

After the demonstration, an address on Benjamin Franklin was delivered by John Stephen McGroarty, author of the Mission Play. The meeting was followed by a meeting at the Biltmore Hotel by the Chamber of Commerce, when a similar demonstration was arranged which was followed by an address by Frederick Warde.

Architects of Denver, Colo., are to be the guests of the Electrical Cooperative League of that city on Feb. 5, when a special banquet of the league is held at the Hotel Metropole in Denver.

Manufacturer, Dealer and Jobber Activities

The Ward Leonard Electric Company, Mount Vernon, N. Y., has just issued its Bulletin No. 57 dealing with Vitrohm speed regulators. This bulletin will be furnished upon request to the factory.

The F. W. Wakefield Brass Company, Vermillion, Ohio, has recently issued new and revised data sheets on "Red Spot" lighting specialties. The several publications include data sheets on the standard "Red Spot" line of hangers, accessory fixtures and materials and on the new porcelain enamel kitchen lighting units.

Dossert & Company, New York, N. Y., has just received from the press the twentieth year catalog of Dossert solderless connectors for stranded and solid wires, rods and tubing. It marks a very substantial enlargement over previous catalogs in the matter of data and information, brought up to the minute. The book further takes up the subject of putting together a typical Dossert joint, illustrating it completely. On one page are presented twelve of the most frequently encountered types of joints and how they can be made into Dossert joints.

The Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has announced that it has put on the market a line of centrifugal pumps for fire protection that are of the single stage type and meet with Underwriters' Laboratories, Inc., specifications. The cost of the single stage pump is claimed to be less than that of the multistage type.

The Westinghouse Lamp Company has recently prepared a two-reel film entitled "Show 'Em How." The film is designed to be shown before electrical men of the country. The company offers the use of the film without charge to any organization in the electrical industry that will pay the express charges to and from New York.

The Pittsburgh Transformer Company, Pittsburgh, Pa., has recently opened a branch office at 531 Call Building, San Francisco, Calif. J. G. Corrin, formerly sales manager of the company with headquarters at Pittsburgh, will be in charge of the newly opened branch.

Benjamin Electric Manufacturing Company has announced from its Chicago, Ill., office that during the week of Feb. 9-14 it will conduct a Valentine week window dressing contest. Benjamin two-way plugs are to be featured in the contest. The trim for the windows will be furnished by the manufacturer.

Reiman Wholesale Electric Company, Los Angeles, Calif., has announced that it has recently been appointed southern California distributor for Bryan-Marsh Mazda lamps.

The Thomas Goldschmidt Corporation, New York, N. Y., has recently announced the appointment of Harry E. Sherwin as marketing manager of the organization which handles radio equipment. Mr. Sherwin was formerly with Robert H. Ingersoll & Brother and was sales manager for the A. C. Gilbert Company of New Haven, Conn.

The Eggers Pole & Supply Company of Spokane, Wash., whose new butt treating plant was installed last summer, is planning on increasing its output by adding a night shift in the near future. This concern, which ships red cedar poles to every state in the Union, has a capacity of 75,000 poles per year. At present, the output is 4,000 per month.

Engle-Reid Company has recently announced its entry into the field handling materials for utilities and manufacturers. Offices are maintained at 149 California Street, San Francisco, and Terminal Sales Building, Los Angeles. The company is Pacific Coast sales agent for the Scovill Manufacturing Company, Waterbury, Conn., and is representative for the Barnes-Lindley Manufacturing Company, Portland, Ore., manufactur-



Denver, Colo., seems to be the home of pretty girls. Anyhow, this is the second picture of attractive nature that has come from Denver. The young lady shown above is Miss Janette Edwards, who as the electrical queen represented the Electrical Cooperative League of Denver at the Women's Press Club pageant held in that city.

ers of crossarms exclusively, and for the Naugle Pole & Tie Company, Chicago, Ill. George D. Engle, who is in charge of the Los Angeles office, has been connected with the National Conduit & Cable Company for several years. Kenneth M. Reid, in charge of the San Francisco office, has been in the export end of the business for several years and more recently has been selling materials to the jobbers and utilities on the Pacific Coast.

The Premier Electric Distributing Company of Denver has established a radio department in connection with its appliance business. This company was recently given the distribution of Sav-age washing machines in Denver.

Allied Industries, Inc., San Francisco, Calif., has been appointed Pacific Coast distributor for the General Porcelain Company, Parkersburg, W. Va. They will carry stocks for quick delivery at all their Pacific Coast branches. H. S. Perkins, who has been representing the General Porcelain Company on the Pacific Coast, will continue in that position, working through the Allied Industries.

The Oshkosh Manufacturing Company, Oshkosh, Wis., announces a change in the firm name although there will be no change in the personnel or control of the firm. In the future the concern will be known as the Leach Company and the address will be the same as that of the past. B. C. Holst represents the Leach Company in San Francisco, Calif.

The United Electric Company, Canton, Ohio, has appointed A. O. Eagle district manager for the mountain region in the distribution of Ohio vacuum cleaners, with headquarters at Denver, Colo.

John Hancock Electrical Company, Denver, Colo., after a number of years in the retail section of the city, has moved to 1420 Sixteenth Street in the wholesale district and closer to the company factory at 1420 Wazee Street. The sale of appliances will be discontinued and emphasis will be given to the distribution of Columbalite commercial lighting units.

The Public Service Company of Colorado in Denver, Colo., has reorganized its commercial lighting department with Charles E. Addie as superintendent. The city has been divided into seven sections with a representative in each section. Electric signs manufactured by the company are featured along with commercial units.

The Electrical Supply & Construction Company in Denver, Colo., has moved to 16 Arapahoe Street where a larger store and display room has been provided for the display and sale of house lighting fixtures.

Wipplinger & Son is the name of the new lighting fixture manufacturing firm in Denver, Colo., at 1540 Blake Street.

The Apex Electrical Distributing Company, Cleveland, Ohio, has recently placed on the market a new small electric vacuum cleaner which is designed to be carried by hand from one room to another. No wheels or handle are attached to the cleaner which is known as the Rotarex electric vacuum cleaner. The body of the cleaner is of sheet aluminum and all parts are encased in this covering. The device complete with attachments weighs 7½ lb.

The Pelton Water Wheel Company, San Francisco, Calif., has recently published Bulletin No. 19. The publication, which is in catalog form, contains a complete treatise on impulse type Pelton water wheels, parts and accessories. A catalog covering reaction type turbines will be issued in the near future.

The General Electric Company has recently announced that it has created a Southwestern District to handle its apparatus in Texas, Oklahoma, southern New Mexico and southeastern Arizona. The Southwest General Electric Company as such will continue to act as distributing jobber in the southwestern territory. C. W. Hobson has been appointed southwestern manager and L. T. Blaisdell, district manager.

Personals

R. J. Middleton, assistant chief engineer of the Chicago, Milwaukee & St. Paul Ry. Co., was recently elected president of the Engineers' Club of Seattle to serve during 1924, succeeding E. J.



R. J. MIDDLETON

Bartells. Mr. Middleton is a graduate civil engineer, having 22 years of experience, 18 of which have been with the Chicago, Milwaukee & St. Paul Ry. Co. Entering the service of this corporation in 1906 as bridge draftsman, he has received successive promotions to positions of assistant engineer on construction, engineer of track elevation, valuation engineer and for the past five and one-half years has been assistant chief engineer of lines west of the Missouri River with offices in the White Building, Seattle.

C. E. Wilson has been made managing engineer of the conduit and wire division of the General Electric Company's Bridgeport, Conn., Works. In addition to the responsibilities of this position, he will have general supervision over the manufacture of rigid conduit at the New Kensington (Pa.) plant of that company.

Harry E. McAfee, assistant vice-president of the Mountain States Telephone Company, Denver, Colo., has been made vice-president of that company.

R. C. W. Libbey, for over fourteen years with the Simplex Electric Heating Company, Cambridge, Mass., and for the past four years located on the Pacific Coast, has been appointed representative for Landers, Frary & Clark in the states of Montana, Idaho and Utah. Mr. Libbey has just spent some time at the factory in New Britain, Conn., and is now making the rounds of his new territory.

Leonard A. Hobbs, California representative for the Edwin F. Guth Company, St. Louis, Mo., is in San Francisco on business for the firm.

Harry W. Lippert, California and Nevada representative for the Estate Stove Company, Hamilton, Ohio, is attending a sales conference at the factory.

Herman W. Schroeder has been appointed district auditor of the southwestern district of the General Electric Company, following the recent creation of this district by that company.

C. T. Mess, superintendent of the Sacramento, Calif., division of the Great Western Power Company, has resigned from that company to become assistant engineer with the California Railroad Commission.

M. R. Stowell, for many years sales manager for the American Refractories Company, has recently joined the staff of the Vitrefax Company in the capacity of sales manager of the Western division covering the entire Pacific Coast and southwestern states.

J. T. Littlefield, formerly with the Yale Electric Corporation, San Francisco, Calif., has severed his connection with that firm and has joined the sales staff of Listenwalter & Gough, Inc., San Francisco, Calif. Mr. Littlefield will specialize on dealer relations and the sale of Royal vacuum cleaners and washing machines.

J. G. Corrin, who has for some time been sales manager for the Pittsburgh Transformer Company, Pittsburgh, Pa., has been appointed to take charge of the San Francisco, Calif., office of the company which has been opened at 531 Call Building.

Jacob Kahn, president of the Capital Electric Company, Salt Lake City, Utah, was recently in San Francisco on business. While on the Coast Mr. Kahn familiarized himself with the details of the 1924 "Check" Seal program of the Pacific States Electric Company.

S. E. Uncapher and O. B. Rinehart have been appointed assistants to A. J. Francis, manager of fractional horsepower motor sales at the General Electric Company's plant in Fort Wayne, Ind. These appointments follow the recent resignation of S. P. Hirsch as assistant manager of this department.

Kenneth L. Francis, manager of the retail department of the Albert Sechrist Manufacturing Company in Denver, Colo., was elected by the manufacturers' division of the Electrical Cooperative League in that city at a recent meeting to represent the division on the Advisory Board in the place made vacant by R. W. Elliott, who resigned to enter the jobbing business. As honorary secretary of the organization Mr. Elliott was succeeded by E. A. Scott, a well known electragist.

Charles A. Collier, Georgia Railway & Power Company, Atlanta, Ga.; M. A. Curran, manager, Western Electric Company, Cincinnati, Ohio; R. E. Fisher, vice-president, Pacific Gas and Electric Company, San Francisco, Calif.; Joseph Fowler, president, Fowler Electric Company, Memphis, Tenn.; J. E. North, commercial agent, Cleveland Electric Illuminating Company, Cleveland, Ohio; L. L. Strauss, New York City; and Earl E. Whitehorne, commercial editor, Electrical World, New York City, have been appointed by W. E. Robertson, vice-president of the Robertson Cataract Electric Company, Buffalo, N. Y., who was chairman of the conference of representatives of local electrical leagues held on Association Island in September, 1923, to act upon a committee to develop a plan for the national organization of local electrical leagues. Mr. Whitehorne is chairman of the committee.

W. H. Coleman has been appointed merchandise manager of the Chicago, Ill., commercial district of the General Electric Company, according to a recent announcement by H. L. Munroe, manager of that district.

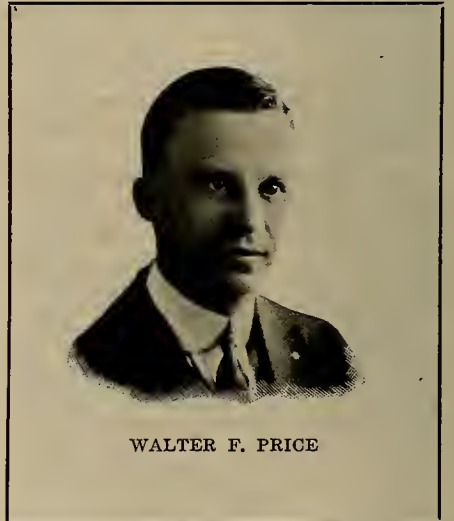
W. M. Ross, of the Rio Vista station of the Great Western Power Company, has been transferred to Pittsburg, Calif., as assistant superintendent.

A. B. C. Dohrmann has been elected a member of the Board of Directors of the Pacific Gas and Electric Company, San Francisco, Calif. Mr. Dohrmann is the active head of large merchandising establishments in Los Angeles, Oakland, San Jose, San Diego, Stockton and elsewhere. He is a director of the Federal Reserve Bank of San Francisco, president of the Yosemite National Park Company, the Emporium and Nathan-Dohrmann Company, and chairman of the Palace Hardware Company, San Francisco.

H. W. Young, president of the Delta-Star Electric Company, Chicago, Ill., and Mrs. Young are touring France, Italy, Switzerland and other European countries. Mr. Young is making an investigation of high tension transmission lines. The couple will sail from Naples about Feb. 1 and should arrive in Chicago about Feb. 15.

C. W. Adams has been made manager of the Savage Arms Corporation for the Pacific Coast. His offices will be at 229 Rialto Building, San Francisco, Calif.

Walter F. Price, architectural representative of the California Electrical Cooperative Campaign since February, 1920, has been appointed executive secretary of the California State Association of Electrical Contractors and Dealers, effective Feb. 1, 1924, succeeding J. W. Redpath, resigned. Mr. Price is a graduate of the Van Der Naillen School of Engineering, and in the capacity of outside telephone engineer



WALTER F. PRICE

was in the employ of the Pacific Telephone & Telegraph Company for nine years. During his service with the California Electrical Cooperative Campaign he has had charge of the building of electrical homes in Oakland, Sacramento and various other California towns and has been very successful in selling the idea of the electrical home to architects and builders. Mr. Price's headquarters will be in the Call Building, San Francisco, Calif.

L. E. Clark, manager, and J. G. Marks, treasurer, of Reiman Wholesale Electric Company, Los Angeles, Calif., have gone to Chicago, Ill., to attend the National Electric Fixture Manufacturers' exhibit. They will return to Los Angeles about Feb. 1.

W. H. Talbott has been elected president of the San Diego Consolidated Gas & Electric Company's Employees' Association for the year 1924.

Gray E. Miller of the Sewickley Electric Manufacturing Company of Sewickley, Pa., is making a tour of the Pacific Coast in the interest of his company and was a recent Los Angeles visitor. Mr. Miller was active in demonstrating the new Semco meter which his company manufactures.

F. L. Easton, district representative of the Economy Fuse Co. in Denver, Colo., is the chairman of a special manufacturers' committee appointed by that division of the Electrical Cooperative League to arrange a dinner and entertainment for the architects of the city, Feb. 5.

J. P. Kennedy, of the Western Electric Company, Chicago, Ill., is a recent visitor to San Francisco.

George P. Baldwin, manager of the merchandising department of the General Electric Company, Schenectady, N. Y., is in San Francisco, Calif., on business.

Miss Inez Thompson, of the Public Service Company of Colorado, Denver, Colo., has been appointed chairman of the Rocky Mountain Division of the Women's Public Information Committee of the National Electric Light Association. This division comprises the states of Colorado, Wyoming and New Mexico. The National Women's Public Information Committee is now in the third year of its work and splendid results have been accomplished in the various divisions where the work has been carried on. Utility executives



MISS INEZ THOMPSON

have taken a deep interest in its activities and have lent their support and cooperation to the movement to educate the women of the industry so that they in turn may do their part in promoting the public relations program which is at this time occupying a prominent place in the utility industry. No women's work has thus far been attempted in the Rocky Mountain division, but it is now planned to speedily form a committee to take up the work enthusiastically and energetically.

Frank H. Klippel has been made superintendent of the Sacramento, Calif., division of the Great Western Power Company and has been transferred to that city from Pittsburg, Calif.

R. H. Ober and Joseph Jacobs, both of Seattle, Wash., have associated themselves for the general practice of civil engineering under the firm name of Jacobs and Ober.

Charles M. Wright, formerly with North Coast Electric Company, Seattle, Wash., is now the Inland Empire representative for the Economy Fuse & Manufacturing Company of Chicago, Ill. Mr. Wright will make his headquarters at Spokane, Wash.

R. J. C. Wood, assistant electrical engineer for the Southern California Edison Company, Los Angeles, Calif., has been awarded the "Transmission Prize" which is offered each year by the American Institute of Electrical Engineers. Mr. Wood's paper, "Southern California Edison Company's 220-kv. Transmission Line and Some 220-kv. Research," won the certificate of award for 1922 and the cash prize of \$100 which accompanies the award. The prize is given each year by the Committee of Awards to the author of the paper that is designated by the Institute committee as the most worthy paper dealing with the art of transmitting electrical energy over considerable distances.

C. W. Hunt, Jr., has been appointed to take charge of the washing machine division of the Savage Arms Corporation. Mr. Hunt will make his headquarters at 229 Rialto Building, San Francisco, Calif.

A. R. Small, vice-president of the Underwriters' Laboratories, has announced that hereafter his offices will be at 109 Leonard Street, New York City. Mr. Small will transact all future business from that address.

B. C. Holst, San Francisco, Calif., has been appointed representative in the western territory for the Leach Company, formerly the Oshkosh Manufacturing Company, Oshkosh, Wis.

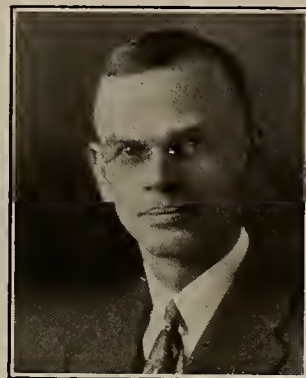
James Hartness, former governor of Vermont, and past president of the American Society of Mechanical Engineers, was elected president of the American Engineering Council to succeed Dean Mortimer E. Cooley of the University of Michigan, at the annual meeting of the Council, which was held in Washington Jan. 10 and 11.

Arthur Purdon, Pacific Coast representative for the Crocker-Wheeler Company, Ampere, N. J., has recently returned from a trip to the factory.

E. R. Stauffacher, protection engineer for the Southern California Edison Company, Los Angeles, Calif., has left for Birmingham, Ala., and Philadelphia, Pa., as well as other eastern cities. He will return in about three weeks.

George B. Thomas, educational director of the Western Electric Company, New York City, is visiting Pacific Coast cities and the branch offices of the company located in that territory. He has addressed the universities of the Northwest and also the meetings of the American Institute of Electrical Engineers. Mr. Thomas will visit Stanford University and the University of California before proceeding to Los Angeles. The general subject which Mr. Thomas treats in his discourses is that of Audition.

Charles E. Canada, sales engineer with the General Electric Company in the Northwest for the past 13 years, has become associated with W. A. Ramsay Company, Ltd., of Honolulu. This company is the Hawaiian representative for the General Electric Company, the Pelton Water Wheel Company, Charles C. Moore & Company and other manufacturers. Mr. Canada was graduated from the Sheffield Scientific School of Yale University in the class of 1907. After leaving college he spent some time in



CHARLES E. CANADA

the test department of the General Electric Company in the Schenectady and Pittsfield works and in 1911 he joined the sales force of the company in the Northwest where he has remained until this time.

F. H. Burnaby, vice-president of the Southern California Edison Company, Los Angeles, Calif., was recently in San Francisco on business for his company.

George P. Wells of the Wells-Morris Manufacturing Company of San Francisco, Calif., manufacturers of the Wells waffle iron and other electrical appliances, was a recent Los Angeles visitor.

Obituary

William Albert Weight, proprietor of the Sterling Electrical Company of Sacramento, Calif., died Jan. 18, 1924, following an operation for appendicitis, contracting pneumonia. Mr. Weight was born in Biggs, Butte County, Calif., in 1879. After obtaining his preliminary education, he became a stenographer and for a period of four years he studied law. Mr. Weight later attended Stanford University after which he entered the California National Bank. He was also with the Wells Fargo Nevada National Bank in San Francisco and the Central Bank in Oakland. Mr. Weight organized the Sterling Electrical Company in 1918.

E. C. Boquet, for the past fifteen years manager of the Southern California Edison Company's offices in the Santa Monica Bay district, dropped dead on Jan. 19. Mr. Boquet had been connected with the Southern California Edison Company since his first employment at the age of seventeen.

Trade Outlook

San Francisco

Retail buying continues satisfactory with preference for seasonal lines. The exceptionally mild weather has reacted somewhat on furnishings and clothing but other apparel lines are strong.

Bank statements show a well entrenched financial position with strong reserves. Money is available for legitimate industrial and commercial development. It is reported that several large eastern firms contemplate Pacific Coast factories or assembling plants. The San Francisco Bay region is a strenuous competitor for the location of these industries.

Oil prices have stiffened and advanced. Metals are strong with some advances.

Construction continues with several large commercial enterprises under way or about to start. Domestic construction has not abated and materials are in heavy demand. Electrical equipment is sold for these structures in increasing amount. Air heaters and ranges as well as water heaters are selling easily and manufacturers are behind in deliveries of some types of this equipment.

Power company developments are proceeding rapidly and energy consumption per capita shows a steady increase, thus indicating a generally healthy condition.

Portland

Business conditions in Oregon during the coming year will be good, according to the best posted authorities, and the state is expected to rank with the most prosperous.

Agricultural conditions are decidedly on the mend. The wool growers have made sharp recoveries from their losses of a few years ago; dairying conditions are good; fruit marketing as a whole has been satisfactory, and there is improvement in the conditions governing livestock. While the situation of the wheat grower is not satisfactory, the outlook is hopeful.

In the lumber industry, which employs more than 60 per cent of Oregon's labor, there is a certainty of continued good times. This major industry will have much to do with Oregon's prosperity.

Portland and vicinity probably never had a better year than 1923, and there is no apparent reason why 1924 should not be equally good or better.

All this means big business for the electrical industry. The central stations have already placed orders for much heavy equipment to take care of the year's program, and expansion is everywhere apparent.

Los Angeles

The electrical business in Los Angeles maintained a very high standard during January, the past month having been one of the best in its history for this season of the year. This is true in all branches.

Electrical manufacturers report considerable activity in all lines, but espe-

cially in the industrial and supply lines. The one branch that is not up to the others at the present time is the sale of small motors, which slumped a little. The electrical wholesale business is also beginning wonderfully well, and there is every indication from the start the new year has obtained that 1924 will be a prosperous one for the industry in this section. Electrical retailers report considerable activity even after the holiday rush, and January has proved an excellent month for them as well as for the manufacturers and wholesalers.

The sale of radio apparatus and supplies has continued and is expected to increase materially during the coming month due to the radio exposition which will open at the Biltmore Hotel on Feb. 5.

The building permits for the first fifteen days of January, 1924, amounted to 2,500 with an estimated valuation of \$5,732,009, as against 2,164 permits valued at \$4,774,327 for the corresponding period in 1923, an increase of about 20 per cent. Bank clearings for the same period of comparison amounted in 1924 to \$332,456,511.52, an increase of approximately 30 per cent over 1923 clearings, which were \$257,156,769.17.

Seattle

Seattle enters the new year with an encouraging record of growth in practically every line during 1923 and bright prospects for a continuance throughout the present year. Lumber, shipping, construction, bank clearances, stocks and bonds all report a healthy growth and an optimistic outlook.

The Seattle Retail Credit Association states a decided advance in credit buying was made during the year just past, and the volume of business done by the association throughout 1923 was 25 per cent higher than for 1922.

Electrical retailers and jobbing houses, as a whole, show a steady improvement from week to week in sales volume, particularly along the lines of fixtures, appliances, house-wiring devices, etc.

There is an encouraging increase in the demand for heavier apparatus, including motors and generators, with sales of transmission line equipment satisfactory, considering the season of the year. The number of important power extensions and improvements planned for 1924 presage a good year for this sort of material and equipment.

Stocks in most lines are reported in good condition. Prices, with a few minor exceptions, remain firm. Collections are fair to good.

Salt Lake City

While the usual seasonal quiet prevails in many lines of business, general conditions in the intermountain section are very satisfactory. A new era of industrial development is well under way, and there is a pronounced feeling of optimism on every hand.

In spite of some declines in metal prices, the mining industry is on a sub-

stantial basis, and there seems to be no indications of any material curtailment in mining operations.

Conditions in the agricultural districts are much better than for some time past.

In all branches of the electrical industry business was better during 1923 than in the preceding year, and the outlook for 1924 is exceedingly bright. New industries, new homes and increased commercial activities are creating new demands for electrical energy, appliances, etc.

Collections are improving steadily. The banks of Salt Lake City are in excellent condition and well equipped to take care of the demands of expanding business.

It may be safely stated that conditions are more encouraging in this section than they have been for several years past, and business interests generally feel that the upward trend will continue and develop in volume.

Denver

In comparison with a year ago, the Rocky Mountain region, especially Colorado and Wyoming, is resisting with much greater success than the rest of the Tenth Federal Reserve district the tendency of business to slow down. This is attested by the volume of checks cashed, the comparison being far more favorable for Denver and the other cities in the western part of the district than for those on the Missouri River. Business is better here than the average for the entire country, according to Federal Reserve reports.

Extra dividends by sugar companies, the opening of new oil wells in northwestern Colorado, and a number of new construction projects have added to the optimistic tone of business conditions.

The situation of the electrical industry is much better than many of its members claim. Admitted that wiring prices are low, jobbers' reports indicate an increasing volume which places the matter of net profits in the contractor's or dealer's hands. In appliances there is the usual after-the-holiday lull, but radio trade is unusually active.

Spokane

From all indications, Spokane and the Inland Empire are facing a very prosperous year, with the general feeling better than it has been since 1920.

In most of the local woodworking plants the present output is slightly above the usual winter average. A new plant for making frame and sash has been announced, construction to begin immediately. The operation of night shifts in a local sawmill and a frame and sash factory, and the statement of a furniture manufacturing plant that its 1923 business showed an increase of 84 per cent over 1922, with the expectation of a similar advance for 1924, indicate good progress in the woodworking industry.

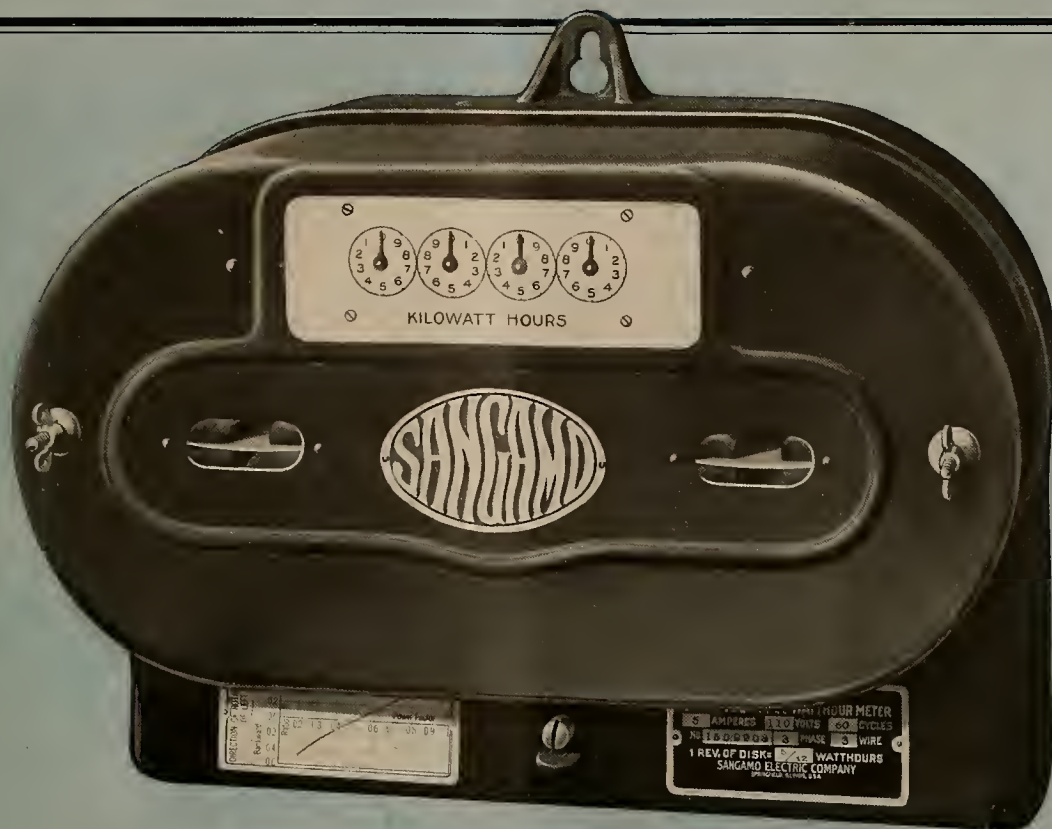
The outlook for metalliferous mining throughout the Pacific Northwest for 1924 is very good. Development of several properties not yet producing has proved very satisfactory, while some of the big Coeur d'Alene producers are commencing 1924 with ore reserves larger than at the beginning of 1923. As a result of mining activity, a local concern handling rebuilt motors reports good business.

Journal of Electricity

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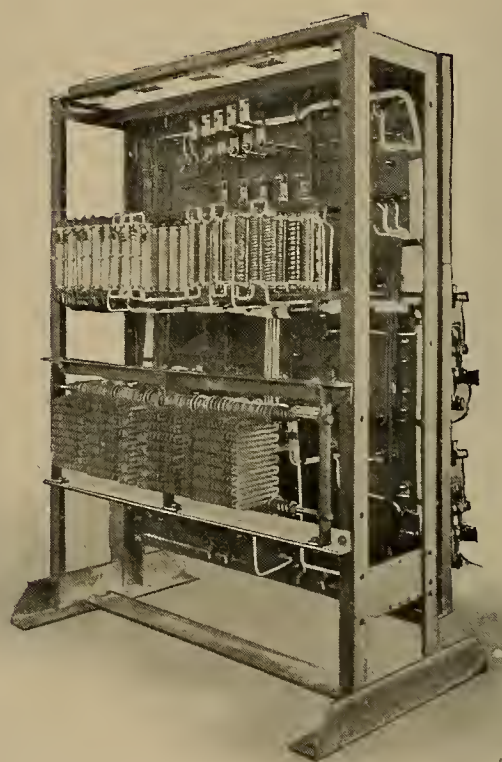
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Power

The News of the Industry

ONE of the many problems confronting the editors of a publication such as this, is to plan so that every subscriber shall find something of interest and value in each issue. The editorial field of the Journal of Electricity is, briefly, the development of central station power and its application to industry and the home. Within the industry itself, there are many highly specialized branches, each with its specific problems, and yet dependent upon one another in many important respects.

There is one common ground upon which all branches meet, and that is the news of the industry. Any man engaged in any phase of electrical work, should, nay, must, keep in touch with what is going on in his chosen field of endeavor.

To fill this need, the editors of the Journal of Electricity have constructed a news-gathering organization of exceptional efficiency. With the general offices in San Francisco as the hub of the wheel, channels through which news flows radiate outward in all directions. There is no important center within the eleven Western states without a special news correspondent for the Journal of Electricity. Each news correspondent is himself connected with the electrical industry in his own locality, and, by reason of his own knowledge and experience, is thoroughly competent to know news when he sees it.

An independent check upon the accuracy of the news matter thus gathered is afforded by the newspapers in each locality. These are assembled, clipped, and assorted by the news editor and his assistant, and then studied with reports sent in by the district correspondents. All copy is read and checked for typographical errors three times before going to press. This is one of the many ways by which this publication serves its clientele.

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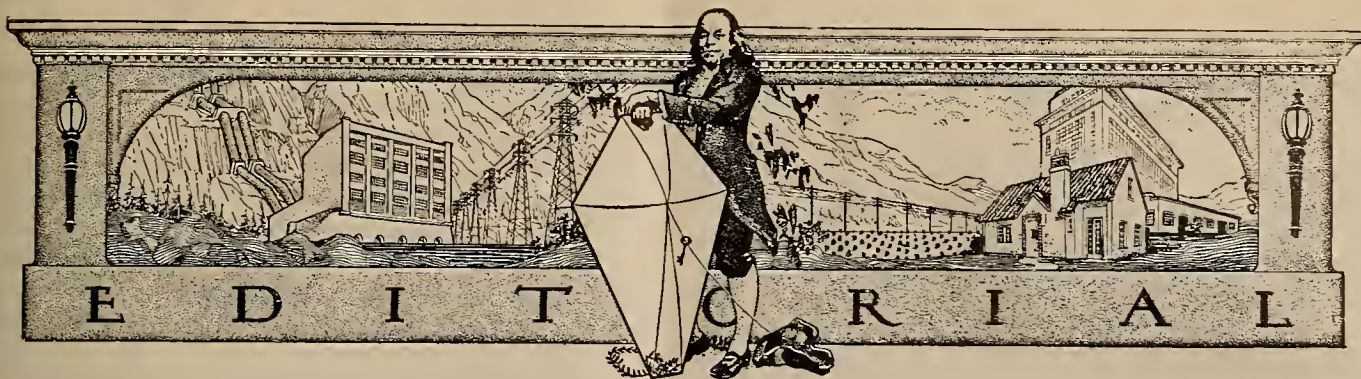
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The High Cost of Initiative

CALIFORNIA is a state interesting in many ways other than its vaunted sunshine, fruit, and flowers. It has become the cradle in which all sorts of experiments in government are rocked by the hands of the "practical" politician, reformers, enthusiasts, preventers, and honest men. Among these may be mentioned the initiative, by which such things as amendments to the State Constitution may be "initiated" by one or more citizens, and, backed by the statutory number of signatures, are placed in due course upon the ballot for submission to the voters.

OF course, the primary object of the initiative is to promote more "popular," and, as a result, less "representative" government. Truly, this would seem a worthy object. The people must rule, and every citizen thus becomes a legislator himself, at least in theory.

HOWEVER, many a beautiful theory is wrecked upon an ugly fact. The initiative is proving a costly, cumbersome affair in many respects, and seems to aid, rather than prevent the incubation of immature, ill-considered experiments in government.

THE 1922 State Water and Power Act is a fair example of this type of initiative measure. On the ballot that year there were a number of others, all embody-

ing radical departures from accepted practices and principles. Thus, almost without warning, many established institutions had to organize hastily, gird up their loins, and fight for their lives. The Water and Power Act, carrying as it did a total of half a billion dollars in the form of a bond issue, received the most attention, and incidentally cost nearly \$662,000 to the proponents and opponents in submitting their case to the voting public.

AN investigating committee of the State Legislature, in reporting on the subject of these expenditures states, "Your Committee * * * is not yet constrained to advise the placing of a limit as to the amount of expenditure, at least until some means is devised whereby both sides of important issues can be adequately and equally presented to the public at less cost."

IT would appear, at least, that such expenditures are an inevitable effect of the initiative of measures attacking any established industry. Any zealot, long-haired reformer, honest well-meaning citizen, or schemer with an axe to grind, can rock the boat of industry any time he likes. If this is what the people want, industry is compelled to pay the cost of self-defense. Truly, success has its drawbacks as well as failures.

The Ultimate Goal of Customer-Ownership

GROWTH in any business carries with it many problems. One of the greatest of these is that of financing improvements and extensions necessitated by increasing demand for service. Money must be provided in constantly greater quantities for investment in plant equipment.

Until Mr. A. F. Hockenbeamer devised the so-called "customer-ownership" plan, practically all utility financing was done by the issuance of bonds, underwritten by syndicates of bankers, and by them sold to investors whose interest in the utility question was abstract rather than concrete. Since then, the customer-ownership idea has taken such a hold upon the imagination of the consuming public, that the great public utilities of today have, in effect, become great cooperative enterprises. Public ownership, in the best sense of the word, is in a fair way of being accomplished without destroying at the same time the efficiency of private initiative.

On another page of this issue is described a customer-ownership drive, undertaken by the Public Service Company of Colorado. Some of the achievements in this campaign are worthy of particular notice. For instance, 16,579 shares of stock were sold in ten days. A total of 551 employees purchased stock and 5,299 customer-shareholders were added. The company has a total of 1,825 employees and 1,085 of these made sales. Moreover, this record was made just a month before Christmas at a time when considerable doubt was expressed regarding the ability of the public to subscribe.

The statement has been made that within two years' time there will be at least a million customer-owners of electric utility securities in America. The Colorado campaign tends to bear out this statement. But why set the bogey at the million mark? Theoretically the job will not be completed until every employee and every customer is a shareholder. We do not feel that it will be impossible ultimately to include all of this group of 10,000,000 or more in the ranks of customer and employee owners.

Public Relations Idea Does Not Extend to the Government

American law-making bodies have spent the greater part of their time during the past two decades devising commissions, committees, laws and courts to act as a check upon private business. A great army of office holders, who go about exercising the Czar-like prerogatives invested in them by law, has been built up for the purpose of applying the business straitjacket often without discriminating between the just and the unjust. But how about the government itself? Checks upon it are few and far between. The citizen is nearly always without recourse. The bureaucrat is judge and jury.

As a specific case, a citizen of Berkeley, Calif., built a house, which was located two blocks outside the city limits. Both the post office and the express company refused to make deliveries to his house. Mail was left at a box set inside the city limits. A

complaint was made to the Railroad Commission regarding the express company. Within a month calls were made to the house.

On the other hand, innumerable complaints, both to the local post office and the postal authorities in Washington, were made with no results. The citizen gave up in disgust, finding it easier to walk the four blocks twice a day to get his mail rather than attempt to obtain the service which he felt was his due.

Now the point in this case is that the citizen had no recourse under law when dealing with the post office department. He could not bring suit. There was no commission or body with which he could lodge complaint as in the case of the express company. Whether or not he received service depended upon the whim of the particular man who was in office at the time. It cannot be expected that his treatment would have been different had he been dealing with any other government-owned utility. Similar instances can be pointed out where municipal ownership is in force.

There are several possible solutions for such situations. One is to place government-owned utilities in the same category as privately-owned ones in the matter of regulation. Another is to consider the establishment of public relations departments in those utilities which are owned and operated by the government. The third, and to our minds, the best, is to continue the privately owned and operated utilities under commission regulation.

Possibilities in Highway Illumination

HIGHWAY illumination is attracting considerable attention in many sections of the West. California, with one of the finest networks of highways in the country; Washington, Oregon, and many of the other Western states with splendid highway systems, should afford a fertile field for the development of this recent electrical application.

Aside from its new-business aspects this field has many other commendatory features. In the first place, it will make possible the extension of electric service to rural districts which are not now served. It will be a simple matter to run extensions from pole lines paralleling the highways. Farms which are at present isolated will be afforded the many conveniences of electric service.

The chief factor in the argument for highway lighting, however, concerns public welfare and safety. Not only would illuminated highways make unnecessary the excessively bright automobile headlights—in themselves a source of danger—but they would reduce the danger of crime,—a fact which has been proved in the case of city street-lighting. A casual glance at the headlines of any Monday morning's paper will prove the need for something to lower the accident hazard on our highways.

If highway lighting will do all these things, then is it not the duty of the electrical industry to take steps to see that those charged with the construction and administration of the highway systems are prop-

erly informed on the subject? It would seem that here is a field for those cooperative agencies which already exist or for a special committee representing the various branches of the industry interested in this application.

The Hidden Reef in the Path of Trade Associations

LITTLE by little, the industrial association movement is assuming a more important role in our business lives. We now have great national organizations through which the combined thought of industrial leaders finds expression. Then there are countless thousands of local associations, that may be affiliated with national bodies, or may be either quasi or wholly independent.

Herbert C. Hoover, Secretary of Commerce, recognizing the great powers of such associations for good or evil has, through his department, published a careful study of this interesting development. In fact, it is not too great a flight of the imagination to regard the institution of the Federal Trade Commission as a counter-move on the part of the government to provide a proper check in case illegal practices should crop up as the fruit of the association idea.

Those within the electrical industry, as well if not better than others, know how great a constructive force their many associations have become. The dissemination of knowledge, the encouragement of study and research, the social quality of their meetings and conventions have met and satisfied a need that could not have been filled in any other way.

There is always the fear that price-fixing and its attendant evil, an organized attempt to control markets, may insinuate their way into the constructive policies that have distinguished electrical organizations, and bring about their undoing.

Fortunately for the electrical industry, there are wise heads in control of organized effort, who will continue the progress of the past along the same lines that have proved their value to the community within which they function.

A Lesson From Mr. Edison's Seventy-Seventh Birthday

ON the eleventh day of this month, Thomas A. Edison was 77 years old, or young. It is related that he started the celebration of his natal day by "punching" the time-clock at his accustomed hour, and then put in his regular 14-hour day. He seems to be a living, breathing refutation of the idea that one may break down from overwork.

No one can question the many contributions of Edison to the welfare of humanity. The real question is, have his great accomplishments been achieved in spite of rather than because of, his 14-hour days, and his burning the Edison Mazda at both ends? Perhaps Mr. Edison will answer. At any rate, all work and no play, makes a combination whereby Jack will get little out of life, especially the average Jack, in which category most of us find ourselves.

There is little doubt, that if one could be freed from the worry incident to the constant struggle for one's daily bread, mere work would be a sinecure. It is worry, not work, that destroys the nervous system, sends the digestive apparatus to the drydock for repairs, and swells the bank accounts of the doctors. The primal instinct for self-preservation makes most of us work, that we may eat. The fear of starvation removed, would we, any of us, put in fourteen hours per day at work, merely for the love of it? We doubt it. Everybody can't be an Edison. Not many of us would want to, if the 14-hour day was part of the price we would have to pay.

In the Matter of the So-Called Radio Monopoly

EIGHT of the most prominent manufacturers of radio apparatus have been summoned before the Federal Trade Commission to answer charges of monopolizing the radio industry. Because these companies have pooled patents in order to combine the good features of each for the benefit of the public and thereby give them the best apparatus obtainable, they are to be made the subject of a sweeping investigation to determine whether or not they are in restraint of trade.

These companies maintain that their monopoly is based on patents alone, that it is legal and that without it, much of the progress in radio communication during the past two years would have been impossible. As to the legality of their contractual relations we are not in a position to judge. We are morally certain, however, that much of the progress in radio art has been due to their co-ordinated efforts. And if the grant of a patent, which under law gives a monopoly to the patentee for 17 years, is both legal and illegal, the statutes are curious things indeed. If one who controls a patent licenses one or more manufacturers to produce a device, and if these manufacturers are then to be indicted by the Commission as a monopoly in restraint of trade, is not something wrong with the statutes governing either the patent office or the Commission?

To go back to the Federal Trade Commission, the New York Times in a recent editorial offers the following comments:

The Trade Commission has a record as well as the defendants. It risks no such penalties for mistakes as do the defendants, and therefore makes more of them. The Radio Trust could not survive such errors as the commission makes with impunity. It has issued 1,062 complaints, with the result of final action in only 563. The courts have reviewed 35 cases, finding that in 23 the orders of the commission were wholly void. Only in seven were they valid. On the balance of presumptions the defendants would stand a 3 to 1 chance of being right and commission wrong. In its report for 1923, the commission says that continuous litigation has resulted from appeals from its procedure, with the result of "developing the law of business practices under the court's rulings." It would thus seem that the commission is more of an aid to lawyers than to business.

Not until the evidence is heard and the commission renders a decision and the courts pass on it in appeal, can it be determined whether the radio manufacturers or the Federal Trade Commission is in restraint of trade.

CURRENT COMMENT



Before a just basis of comparison between publicly owned or operated utilities and privately conducted enterprises of a similar nature can be established,

Publicly Owned Utilities Should Be Regulated

the former should be subjected to the same measure of public regulation that the law places upon the private utility. A measure to that effect was defeated in California in 1922. George L. Meyers, assistant to the president, Pacific Power & Light Company, Portland, and president of the Northwest Electric Association, in a recent statement, brought out some of the reasons why there should be no discrimination between publicly owned and privately owned utilities in the matter of regulation. Mr. Meyers says:

Publicly owned or operated utilities should be subject to regulation by the state in like manner as are privately owned or operated utilities.

The users of service in each instance are entitled to the best assurance of reasonable rates and adequate standards of service. The state by reason of the machinery set up for regulation is the best fitted to do it. It provides an administrative staff qualified by experience and training for the task and this staff applies itself constantly to it. In this way accounting principles and practice of the most approved type can be established and maintained in the interest of uniformity and to properly allocate and account for the expenses of operation and capital expenditures. Adequate standards of service should be fixed by regulatory authorities with the advice and counsel of those of the staff technically qualified and determination made by expert analysis and investigation of the value of property for purposes of rate making and rates fixed for service so as to be as nearly equitable as possible among all classes of users and thereby prevent discrimination. Regulation can be fair and reasonable only if it is impartially and expertly administered. The cost, the need of constant check and the adjustments necessary from time to time to meet changing conditions that require expert findings make a qualified regulatory body the most desirable, efficient and fair method of regulation. The cost itself is prohibitive for smaller cities and in the case of the larger ones there is not need of a permanent staff and its maintenance only means an unnecessary added expense in government to be met by an already unduly burdened taxpayer.

Furthermore, impartial regulation is the only safeguard against political manipulation, with its possibilities of unscientific and discriminatory rates and revenue inadequate to care for the expense of operation and fixed charges. It is certain if the state is qualified to regulate private utilities it is equally as well qualified to regulate municipal utilities. The nature of ownership or operation does not warrant any exception in the application of the principle and practice of state regulation. Again, impartial regulation is the only real assurance of a disinterested disclosure of the facts to determine the success or failure of municipally owned or operated utilities. Such representation of the facts, together with a showing of the extent to which the elimination of taxes has been a factor in influencing the cost of service by shifting taxes previously borne by the ratepayer to the taxpayer, are the only means to set forth true comparisons of the operation of such utilities with those privately owned or operated. The municipally owned or operated utility subject at least to proper accounting practices, with its property properly valued and required to report its operations in detail in like manner

as privately owned or operated utilities will not be able to make a favorable showing in defense of the personnel of the administration in power by deferring maintenance, failing to set up proper reserves for depreciation or shifting items of expense to other departments.

The user of service should pay the cost of service applicable to his class of use. The more free regulation is from the influence of politics the more equitable and scientific will be its administration. Consequently, the greater will be the assurances that each user pays his just share of the cost of service and that no user is favored at the expense of another either because of lack of proper regulation or political expediency, and the better the taxpayer will be protected from making up in revenue what the ratepayer does not provide. Competent regulation is the taxpayer's only safeguard against being made the goat of incompetent management just as it is the ratepayer's only safeguard, whether it be a municipal or private utility, against unjust charges and inadequate service.

Public ownership should stand or fall upon its merits as disclosed by a true presentation of the facts.

The municipality is the creature of the state and if the state's protection is good for the people of some municipalities it should be good for all of them.

If the municipally owned or operated utility is efficiently and fairly conducted then the municipality has nothing to fear from such regulation and if it is not so conducted then the ratepayer and taxpayer have everything to gain.

To those industries and utilities who are assuming the role of interested spectators in the campaign for public ownership of the light and power business

A Menace to All Private Enterprise

we would sound a word of warning. If they are planning to attend the funeral of the power industry, we would advise them to stop at the undertaker's on their way home and order their own caskets. Their turn is next. Attention might be called to the move in Washington to place telephone companies under the regulation of the cities in which they operate. The Manufacturer, in a recent editorial, has the following to say on this subject:

The State of Washington is to be harassed with an initiative measure which would provide for "home rule" permitting cities in the state to regulate telephone companies within their own boundaries, instead of having telephone companies come under the jurisdiction of the state department of public works, which department corresponds to public service commissions in other states. In other words, the proposed measure would step back twenty years in the matter of public utility regulation, and throw the telephone companies back into ward politics where they would be the playthings of every political administration.

Corruption that developed under this practice in years past, was the reason for establishing state regulation, which has taken state public service companies, including telephones, out of politics.

The term "home rule" is a misnomer and misleads the voter. "Home rule" means political rule, rather than scientific rate regulation by duly constituted authorities capable of giving their whole time and attention to the subject.

The agitation for "home rule" is really a compliment to state regulation. The movement does not come from the

people, but is inaugurated by politicians who, through state regulation, have lost their opportunity to juggle local public utilities by making them campaign issues.

The same publication points out some of the inherent weaknesses in the scheme for public control of the electric power companies of that state. Concerning this phase of the general socialistic move, the paper says:

A meeting has just been held in Seattle, Washington, to put the finishing touches on a measure that will be submitted to the people to launch the state in the development of hydroelectric power with public funds.

It is interesting to note that those attending the meeting and the speakers favoring this socialistic measure were practically all public officials or ex-public officials. Of course, the movement is heralded as a campaign "to break the grasp of the power trust and save for future generations the natural resources of the state."

This is the same cry that was raised in California when the people were asked to mortgage the state for \$500,000,000 for political development of hydroelectric power. The measure was defeated by a vote of over two to one in a state election. There is no "power trust" under state regulation.

There is no demand on part of public for state development of industry. The whole program is worked up as a political proposition for the purpose of appealing to large numbers of voters who are uninformed or misinformed on the subject.

Any person who cares to investigate will find that 85 per cent of the undeveloped water power in the United States is under federal control. To utilize this power the applicant must get a lease from the government for a period not exceeding 50 years. At the expiration of such time the government may take the property over at actual cost or extend the lease. Thus, it is impossible under our present laws to violate the rights of future generations.

The supporters of state ownership resist most aggressively any suggestion that publicly owned plants be required to pay taxes the same as any other industry, thus relieving the general taxpayer from the double load he must carry under our present laws which exempt publicly owned property from taxation.

As an advocate of the state ownership scheme says: "An elaborate legal structure for the preservation of the public's interest in the state's white coal resources will be necessary eventually."



Wahl in Fresno (Calif.) Bee.

THE FAITHLESS HUSBAND

This would naturally follow as part of the spoils of political operation of industry involving the expenditure of hundreds of millions of dollars. The taxpayer would foot this additional bill for the publicly owned properties which would go untaxed, although they doubled the number of employees on the public payrolls.

No supporter of the measure so much as mentions the subject of taxation. Every citizen who thinks, knows that such an undertaking would increase the tax bill enormously. There is no shortage of power in the West and the whole conduct of public utility industry, including regulation of service rendered and rates charged, is under public control in the hands of state regulating and rate making bodies.

Private control of public utilities with governmental regulation has been successful in a way that public control and operation has never even approximated where tried. The initiative and good management obtained by privately controlled companies is the thing lacking under political or public ownership plans.

If the state of Washington can be loaded with a mortgage aggregating hundreds of millions of dollars for state development of industry, what a mecca it will be for the job-hunting politician and thousands of additional employees on the public payroll.

Politicians often unjustly criticise those state regulatory bodies which are charged with supervision of public utilities. The charge is made that such organizations fail to accomplish their

Commission Regulation Defended

purpose, which, in the mind of the politician, is to reduce rates. Such attacks are made at times and in localities where municipal

or government ownership of a particular utility is an issue. In Washington, where such charges have been made, the Washington State Weekly (Seattle) rises to the defense of commission regulation in the following editorial:

The attitude of mind most difficult to understand—unless the individual possessing it is a demagogic politician—is that of the jaundiced person who thinks public utility regulation is a failure because regulatory bodies have had to raise rates many times instead of lowering them.

Regulation is not a failure. It is a success. It has resulted in better service all along the line from all utilities, except the municipally owned utilities, over which those commissions have no jurisdiction.

Rates are generally lower than a couple of decades ago, and average much lower over the whole range of utility service.

What we must have is service. The regulatory body sees that we get it, and good service, too.

But if the utility lives and grows and expands as demand for service increases, it must have let-live rates for that service.

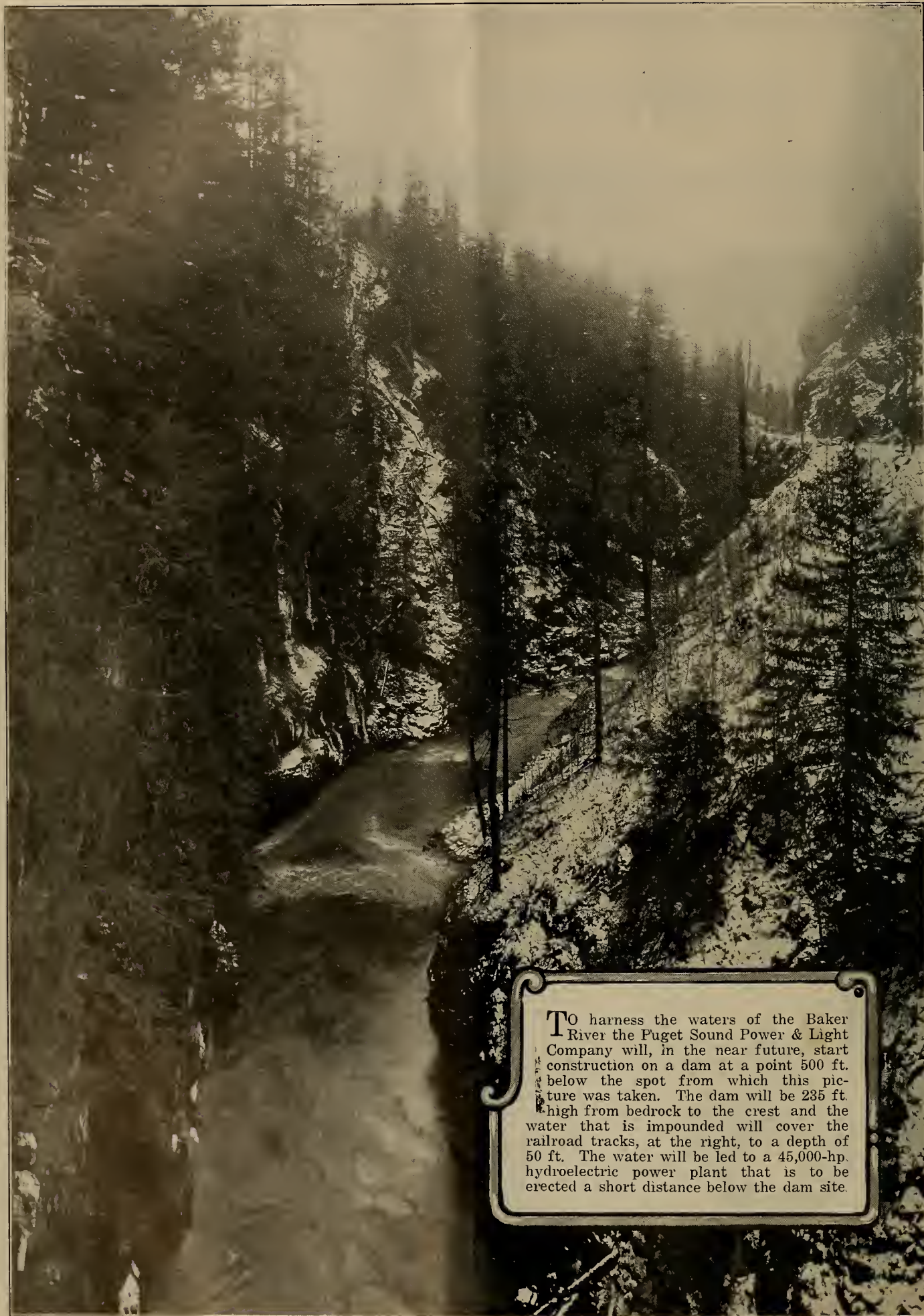
The public service regulatory bodies see that they get such rates—no more and no less. To grant higher rates is often as necessary a public duty as to lower them.

The regulatory officials that have the intelligence to see their duty and courage to do it, deserve at once the support and respect of the public.

In this connection, the remarks printed by the Oregon Voter (Portland), on the subject of taxation of utilities, will be of interest. This paper says:

First, if another tax is added to the utilities, it will have to be paid by the patrons of the utilities in the form of increased rate or a direct addition of the amount of the tax on each month's service bill.

Second, if it is made harder for the utilities to operate in Oregon, through increased costs and the resultant increased rates, it will be just that much harder for them to obtain the necessary new capital required for their extension. The farmers are especially concerned as to extension of existing utilities, as they are anxious to gain the benefits of their service if the utilities can get the capital wherewith to extend further into rural districts.



To harness the waters of the Baker River the Puget Sound Power & Light Company will, in the near future, start construction on a dam at a point 500 ft. below the spot from which this picture was taken. The dam will be 235 ft. high from bedrock to the crest and the water that is impounded will cover the railroad tracks, at the right, to a depth of 50 ft. The water will be led to a 45,000-hp. hydroelectric power plant that is to be erected a short distance below the dam site.

Setting a Stock Sales Record

By John T. Bartlett

CUSTOMER ownership campaigns of the future may learn something from Colorado. Here is a story of achievement that, I believe, sets a record. In all, 16,579 shares of stock in the Public Service Company of Colorado were sold to customers in a single ten-day campaign. About 61½ per cent of the company's 80,000 customers were thus secured as stockholders. The company's employees, acting as salesmen, sold 9-10 shares per employee in Denver, the principal city served. All of this was accomplished at a cost for advertising of approximately \$1 per share sold.

At a time when there was much general pessimism concerning the public's ability to subscribe liberally, 6,244 shares were actually sold for cash. Northern Colorado cities served by the company came through with liberal subscriptions. At Cheyenne 17 per cent of all customers purchased stock.

Workingmen contributed the bulk of the subscriptions. The stock offered was 7 per cent preferred, at a price to net about 7½ per cent. A monthly payment plan, \$10 down, \$10 a month, was offered, one feature of which was that the customer-buyer obtained title immediately, and became the recipient of monthly dividend checks, the company retaining possession of the stock through power of attorney until the stock should be fully paid for.

The Denver campaign is worthy of study because through skillful co-ordination of advertising and selling effort, and efficient campaign methods within the organization, 5,850 people purchased stock in a ten-day campaign. New York headquarters of the Doherty properties supplied men and plans. Procedure on the ground was adapted to Denver conditions, cooperating with the Public Service Company of Colorado's publicity department on publicity and with the management in perfecting means and methods.

The campaign formally opened Nov. 10. The initial story of it, so far as the Denver and Colorado public was concerned, was made public with a full-page newspaper advertisement on Nov. 5, appearing in all dailies in the territory. This was followed by other full-page advertisements on the two days following. The initial advertisement, headed, "You Can Share in the Earnings of Your Home Public Utility Company," was illustrated with sketches of the company's main office building at Denver, of the present plant, of the new plant being built at Valmont, and an inspirational sketch in which a workman stood pointing to a plant, "Part of it belongs to me."

IN ten days time the Public Service Company of Colorado sold 16,579 shares of stock to 61½ per cent of its consumers. In achieving this record many novel ideas were perfected both for the organization and execution of customer-ownership campaigns. In this story the methods employed are described in detail.

In the plan, this advertisement, which went into extensive detail concerning the company and its business, was designed to sell the company to the public. The next page advertisement had for its purpose selling the reader on the attractiveness of public utility securities as investments. The third advertisement, showing a line of cus-

tomers approaching the cashier's window to pay light bills, had still another point of attack, as the heading shows. It read, "You can help to make earnings possible: Why not share in these earnings?"

This advertisement contained a list of eight leading Denver banks—some of the strongest financial institutions in the Intermountain region—which, it was stated, would receive subscriptions. Customers in other than Denver territory were told that leading banks of their sections would serve them also. The advertisement announced that if the reader was a customer of the company, his mail on Nov. 8 would contain "an announcement of interest."

The four-page letter which reached all customers on Nov. 8 was printed in two colors, illustrated with sketches, and gave an attractive presentation of the security offered, the high yield, the soundness of the company, its prospects, the relatively small amount of stock offered (10,000 shares, only about one share per customer), and the dividend-payment plan. It inclosed a subscription blank. The customer could hand his subscription in at the company's office, to any employee, or to a bank.

This was the way with which the company opened the campaign, followed up by detailed selling effort which will be described later. The newspaper advertising campaign continued thereafter, but much smaller space was used. Advertising in newspaper did its heaviest work before the company employees (the salesmen of the undertaking) had begun to work. Later advertisements in the newspaper series used such headings as, "A Security Recommended by People Who Know," "Next to National Banks in Freedom From Failure," "One Business That Must Go On," "Your Income Brought Right to Your Home," "Yes, But Suppose I Need My Money." The advertisement mentioned last explained the offer of the company to serve the customer in the resale of the security at any time.

The concentration of advertising effort before the ten-day campaign had really begun, a point of which careful note should be taken, was enhanced further by direct mail advertising matter which went out on Nov. 9. This was a small broadside, and it bore on the address side, "An Employee Will Call."

A sketch of an employee at the door was given. After explaining that an employee would call, the full inner side gave additional matter under the title, "Just What This Security Offers You." This was pointed with statements that any employee could take orders for stock, and, "Employees have first-hand facts. Let them tell you about Public Service Company of Colorado."

Just as the initial newspaper advertising had canvassed readers on the stock offering, and as the letter to all customers had repeated the message, so did this, "An Employee Will Call," broadside do it again. As a matter of fact, many subscriptions came in by mail and otherwise, showing many brought to the point of action by printed salesman-ship alone.

However, all the foregoing was working toward a complete job. This, following advertising matter just described, culminated with the employee's call. Note the singular word. **One call.** Employees were not expected to make more than one call to make a sale. They were told to close on one call, not to plan second calls.

At this call, the employee, according to instructions, explained 10 points. In the little booklet of instructions given to all workers, entitled, "BOOK OF FACTS About Giving Customers An Opportunity to Buy 7 Per Cent Preferred Stock of the Public Service Company of Colorado,"—incidentally, a story in itself—the employee was told to explain these, and

how. If he wasn't able to explain them, he was told to read them to the prospect. If he did not feel competent to do either, he was told to hand the customer-prospect a little yellow leaflet entitled, "Partnership Opportunity," which bore on the front, "Our Company has asked me to give you this opportunity to become a profit-sharing partner with us. They have asked me to stay while you read this little booklet because you may wish to ask some questions." Since the 10 points the employee-salesmen were asked to make were an important feature of the campaign, it is well perhaps to quote them here, as they were printed on the yellow leaflet, and as they were given to the men in the instruction-booklet.

The Company has asked me to tell you these ten points about our organization and its preferred stock.

1. You can become a partner in our Company by investing some of your savings in the 7 per cent preferred stock of the Public Service Company of Colorado.

2. This stock represents an ownership in our Company and all its property. On each share of the stock the Company will pay you \$7 a year, payable monthly.

3. You may feel sure you will always get these dividends and that the stock is an absolutely safe investment. I believe it because I know our Company and the men who run it, and I believe in them; I know that behind this investment are power houses, lines, buildings, substations, transformers, gas plants and distribution systems; property that is worth a good deal more than all the bonds and all the preferred stock outstanding, so there is real property behind the investment. I know that our company is selling a necessity, without competition and under proper regulation. I know the Company earnings are growing steadily. I know the Company is in a sound financial position. I believe that you and

PUBLIC SERVICE COMPANY of COLORADO

A letter to our customers

WOULD you like to own part of a strong, prosperous and growing home Company, and to share in its earnings? An opportunity to become a profit-sharing partner in the Public Service Company of Colorado will be given, beginning November 10th, to you and to every customer of the Company.

An opportunity of this kind was never before offered to our customers.

The Company's purpose in offering you this opportunity is frankly to secure the largest possible measure of customer-ownership.

The money which will be raised by the sale of this security and which will be used to pay for the developing of power, the extension of lines, additions to gas works, and for similar purposes, could be raised more easily by selling this issue to Eastern security houses, to be distributed among the capitalists of the East.

The Company is pledged, however, to a policy of customer-ownership.

To you, as a customer of the Company, customer-ownership offers a chance to become, on a favorable basis, a profit-sharing partner in one of the largest and soundest power and gas companies west of the Mississippi.

To the Company customer-ownership will mean a steady increase in public good-will and customer cooperation.

To customers and Company alike it will give a mutual interest in bringing to the territory we serve factories and mills, payrolls and purchasers, population and prosperity.

To carry out this profit-sharing plan, the Company will sell to its customers, and to members of their immediate families and friends, 10,000 shares of its 7% cumulative preferred stock. This stock will be sold at \$93.50 a share—an extremely favorable price.

Every dollar you invest with the Company makes you an owner of a proportionate part of the Company's business and of its property—power plants, lines, substations, buildings, transformers, gas plants, motors. On each share you buy the Company agrees to pay you, out of earnings, \$7.00 a year in dividends—a return of virtually 7½% on your money.

IF YOU NEED TO GET YOUR MONEY OUT—

Yes, but Suppose I Need My Money

The bankers call it "convertibility" or "marketability."

But the owner can, investing his savings, express the same idea thus: "I put my money into something I can get it out of easily."

Your investments will tend to promote honest ideas at right, if, when you invest, you watch that point. Much comfort results from the feeling: "If I need my money, I can always get it."

It is in recognition of this fact that The Public Service Company of Colorado conducted its Ready Service. This is of its stockholders as they direct from Company employees.

The Company has always been able to recall the Preferred shares of any of our stockholders who bought direct money out. We believe we can always do so. A small charge is made for this ready service.

The good faith and the honesty of The Public Service Company of Colorado is behind this ready service—we feel sure that our customers will ask no more.

The price of our Preferred shares is \$93.50 a share.

From November 10 to 19 any employee can take your order.

The Public Service Company of COLORADO

SUCCESSOR BY MERGER TO
THE DENVER GAS & ELECTRIC LIGHT COMPANY
AND THE WESTERN LIGHT & POWER CO.

Samples of some of the circulars and advertisements used in the stock selling campaign.

every other person who owns this stock will always get their dividends.

You agree with me, don't you, that this stock is a safe investment?

4. Our preferred stock is not only a safe investment, but it is a convenient investment. There are no coupons to clip, no mortgages, no foreclosures, no repairs, no rents to collect. There is no worry, no bother, nothing to do but cash your monthly dividend checks.

5. It is not only a convenient investment to own but it is easy to get your money. If you need to sell your stock, you can turn it over to us for resale. Our Company makes a charge of \$2 a share for this resale service.

6. The Company could easily sell to eastern brokers all the stock it has available. We believe, however, in customer ownership, and prefer to have as partners people here at home.

7. Because we are anxious to get our customers to become partners in our Company, this stock will be sold, in this campaign, only to customers and to members of their immediate families or friends.

8. As the supply of this stock now available is very small compared with the number of our customers, we can sell not more than 20 shares to any one purchaser.

9. This security is now selling for less than it is worth. We feel sure that the price will soon advance.

10. Your money invested with us, at the price you can now purchase this stock, returns you $7\frac{1}{2}$ per cent. This is a high return, safety considered.

You can purchase this security, if you wish, on the dividend payment plan—\$10 down and \$10 per month.

A great many of the employees of our Company already own shares of this stock. We all believe in the security and in the Company.

In conclusion, the leaflet invited the reader to ask any questions, on any of the mentioned points, which occurred to him. "I have first-hand information about the company because I work for it," the leaflet stated. "I shall be pleased to answer any questions you might like to ask and would cheerfully give personal attention to your order for shares. Please tell me where you want your dividend checks addressed and please put your name on the order blank just as you want it to appear on the stock certificate."

The calls, in the manner mentioned, were made by employees on people whose names had already been furnished by individuals to the publicity office. Every employee was asked to turn in at least ten names, later calling on each. Actually, a large number of employees turned in many more than ten names.

The foregoing has outlined the procedure leading to the sale. It does not, however, reveal the measures taken to keep the organization on its toes, at full speed, for the ten-day campaign. Organization began about two weeks before the campaign opened. Departmental meetings were held in Denver, and in the different cities and towns in the Western division. General officials of the company or department heads presided. The selling plan was thoroughly explained. The system to be followed by employee-salesmen was carefully gone into.

A final big dinner was held in Denver the night before the campaign opened.

At Denver, the organization was divided into "armies," each with an organization of general, captains, etc. The generals were V. L. Board, general superintendent, Rufus Gentry, Denver new-business

manager, John E. Loiseau, secretary of the company, Harry Hughes, treasurer, and Salisbury Smith, manager of the securities department. Assistant General Manager Charles Semrad was general of an army which included the Western division. Here the different towns and cities were regarded as separate units.

Four prizes were offered in each of the divisions. There was \$100 for the employee selling the largest number of shares of stock, \$50 for second highest; \$100 for the most new stockholders, with a second of \$50. John E. Barker of the purchasing department was high man in sweepstakes, selling 388 shares. G. A. Hamilton, of the hotel and restaurant division, was next with 314 shares. The high man in the Western division was F. S. Peterson, an engineer in the electric distribution department at Cheyenne. He sold 188 shares. The Denver new business department topped all others, selling 3,528 shares. The electric department was next with 2,626 shares. In the Western division, Boulder sold 1,454 shares. General Board's army was first, with 4,340 shares, and General Gentry's second, 3,347 shares. General Semrad's army sold 3,244 shares, with the high average of 14.7 shares per employee. An unusual development was support in towns buying current at wholesale of the company. Several of these wholesale customers sold stock extensively.

A campaign inspirational device that proved most effective was a miniature daily newspaper, "Daily News of the Public Service Company of Colorado." This was distributed to all employees each morning, there being fifteen issues in all, the final an "Armistice Signed" edition on Nov. 24.

This paper printed the standing of sales groups from day to day, and gave many intimate sidelights on the progress of the campaign. The "Daily News" never gave morale a chance to slip a cog. Window displays were used throughout the campaign. Selling 16,579 shares, approximately 50,000 people were called on.

To all the new customer-shareholders, the company, by Clare N. Stannard, commercial manager, sent a letter of thanks. This letter, however, did not go out until the first dividend checks, Dec. 1, were mailed. The reaction of many from this circumstance was to come in and buy more shares.

Not all the employees had friends to call on. Some of the measures used will illustrate the spirit of the organization. One of the office men visited fifteen stores in each of which he bought a spool of cotton. With this opening, he talked stock to the salesperson. He sold twelve shares of stock! An employee of Swedish extraction, at a loss for people to call on, picked names ending in "sen" and "son" from the directory. He made friends and sold a whole lot of stock. A new employee from Iowa canvassed house-to-house for five days, with little luck. Then he tackled downtown office buildings, and in the first sold twenty shares after talking to but four people. There were countless similar experiences.

It was a great campaign, from start to finish, from every angle. It didn't "just happen." It resulted from skilled planning and execution.

National Electrical Code Circuit Grounding Requirements

By Claude W. Mitchell

Electrical Engineer, Board of Fire Underwriters of the Pacific,
San Francisco, California

PRIMARILY, low-potential, alternating current circuits are grounded for the purpose of minimizing the life hazard. The voltage of the low-potential circuit is not high enough under normal conditions to cause death or injury, ordinarily. However, cases are on record in which death has been caused by contact with wires of ordinary house lighting circuits

The real hazard of low-potential circuits lies in the fact that there is always present the possibility of having impressed upon them higher potentials through contact with wires of high-potential circuits or through leaks in insulation between windings of transformers. Such a contact or leakage places wires of the low-potential circuit at practically the full voltage above ground of the high-potential circuit unless the low-potential circuit is grounded through a low resistance. If this ground connection does not exist then it is liable to be formed through the body of a person coming in contact with electric-light fixtures or other appliances or apparatus connected to the low-potential circuit and, probably, with results fatal to the person. It is apparent, therefore, that it is extremely desirable that low-potential alternating-current circuits have permanent and reliable ground connections having resistance as low as it is possible to obtain. And it is the belief that this may be attained through application of the rules contained in Sections 901 to 906, inclusive, of the National Electrical Code.

As these sections include rules for grounding of lightning arresters, equipment, conduit, armored cable, etc., as well as low-potential circuits, it has seemed desirable for this article to deal with those which relate to the latter only.

The rules state that "alternating-current system shall be grounded if the maximum difference of potential between the grounded point and any other point on the circuit does not exceed 150 volts." It is recommended, also, that such systems be grounded if the difference of potential exceeds 150 volts but does not exceed 300 volts. "The connection with the ground on alternating-current systems shall be made at each service before being connected to the line; provided, however, that by permission of the inspection department the connection may be made on or near the transformer, or transformers, or by connection to a system of ground wire."

The provision that ground connection at the

IN this article Mr. Mitchell describes fully the provisions of the new Code governing the matter of circuit grounds. As this is perhaps one of the most important sections of the entire Code every contractor-dealer and constructionist will be interested in the details explained herein.

service shall be made before being connected to the line (i.e., outside distribution system), permits the inspector to assure himself that such connection has been made properly before certifying that the installation is ready for connection to current supply lines.

In the great majority of cases the requirement

for grounding at each service makes it highly improbable, because of the number of grounds, that there will be at any time an entire loss of the ground connection. Another advantage of multiple ground connections is that, approximately, the resistance varies inversely as the number of such connections. One possible disadvantage of multiple ground connections is that because of unbalanced loads or other reasons there may be a flow of current through and between different ground connections. But the advantages of assured continuity and reliability which are obtained through the installation of multiple grounds will generally more than offset the disadvantage of possible flow of current. Unless the unbalancing of loads is extreme, or other causes very abnormal, this current will be very small and heating or electrolysis resulting from this small alternating current may be considered as a negligible quantity.

The rules provide that the connection and contact with the ground shall be permanent and effective and shall always be made to an active, continuous, metallic underground water piping system if one is available. In the case of a multiple ground for an alternating current secondary the point of connection to the piping system may be on the house side of the water meter but care shall be taken to keep the connection with the underground piping system continuous and permanent by bonding all parts of the piping system which are liable to become disconnected, as at meters and service unions, by means of a shunt consisting of two approved clamps and a conductor of the same size as the grounding conductor. Gas piping shall not be used as a ground for circuits.

Without doubt an active, continuous, metallic underground water piping system constitutes the best ground for electric circuits. There should be no objection on the part of managers or owners of waterworks systems to the grounding of low-potential alternating current circuits to these systems in the manner prescribed above. Any possi-

bility of injury to men removing water meters or doing other work on the service pipe lines may be eliminated entirely if ground connections are removed before doing the work.

If the alternating current system service ground connection is made to a water pipe on the house side of a water meter and such meter is insulated from the rest of the water piping system, then, in effect, the ground connection may be considered as being made to a purely local piping system. The resistance of such grounds probably would be extremely variable as the length of buried pipe would vary from several feet to none at all and the nature of the soil and moisture conditions would be the same in very few cases, if any. The rules require that the combined resistances of the grounding wire and the connection with the ground shall not exceed 3 ohms for water pipe connections. If such conditions, due to insulating of water pipe joints and meters or other causes, are such that this limit will be exceeded then another method shall be adopted.

If circuits are to be grounded at the services where grounding on water piping systems is undesirable or impracticable, practically the only other method which may be employed is the construction of artificial grounds such as buried plates, driven pipes or driven rods. In most cases the buried plates would not be practicable for use at services. If they are used they shall be at least .06 inch in thickness if of copper, or not less than $\frac{1}{4}$ inch in thickness if of iron. The combined resistances of the grounding wire and the connection with the ground shall not exceed 25 ohms for buried grounds. Each ground shall present not less than 2 sq. ft. of surface to exterior soil but additional area will generally be necessary in order that the maximum limit of 25 ohms shall not be exceeded. Where it is impracticable with one artificial ground to keep within this limit, two artificial grounds shall be provided. These shall have a combined area of not less than 4 sq. ft. and shall be placed at least 6 feet apart.

If driven pipes or driven rods are used the provisions of the preceding paragraph relating to resistance and duplication of grounds shall apply to these also. Artificial grounds, whether buried plates, driven pipes or driven rods shall be embedded below permanent moisture level, where practicable.

Ground pipes of iron or steel shall have an external diameter of not less than $\frac{3}{4}$ in. Under this rule a $\frac{1}{2}$ -in. pipe is the smallest permissible. In order that each ground shall present not less than 2 sq. ft. of surface to the exterior soil it is necessary to drive a $\frac{1}{2}$ -in. pipe so that a length of 10 ft. is below the surface of the soil; a $\frac{3}{4}$ -in. pipe, $7\frac{1}{2}$ ft. and a 1-in. pipe, approximately 6 ft. Approved ground rods shall be not less than $\frac{1}{2}$ in. in diameter. To comply with exposed area requirements a $\frac{1}{2}$ -in. rod shall be driven so that there will be below the surface of the soil a length of 15 ft.; a $\frac{3}{4}$ -in. rod, 10 ft. or a 1-in. rod, $7\frac{1}{2}$ ft. Some safety codes specify 6 ft. as a minimum for depth of driven grounds. To comply with this would require a 1-in. pipe or a $1\frac{1}{4}$ -in. rod.

Under certain conditions permission may be given by the inspection department to waive the requirement for grounding low-potential alternating-current systems at each service, accepting in lieu thereof ground connections on, or near the transformer, or transformers, or by connection to a system ground wire. The requirements for ground connections at or near transformers are identical, practically, with those for service connections as outlined in the preceding paragraphs. Preference should be given to suitable underground water-piping systems, if available. Otherwise, artificial grounds will have to be resorted to and, in all probability, more than one will be necessary at each transformer or bank of transformers in order to obtain a ground connection having resistance sufficiently low. Because of the location of transformers it is quite often impracticable, if not absolutely impossible, to obtain ground connections which may be depended upon with any degree of certainty during all seasons of the year. For this reason inspection departments should not grant this special permission, as indicated in Rule 902-d, if multiple service ground connections are feasible, especially as a transformer ground may be the only one on a system serving quite a large area and loss of this one ground connection might introduce high potential upon circuits in a large number of buildings at the same time.

In localities where water pipes are not available and soil conditions such that good grounds are difficult to obtain the installation of a system common ground wire probably is the best solution of the grounding problem. A number of secondary circuits are connected together through this common ground wire, which is grounded at each transformer and at other points along the line where good ground connections may be had.

Regardless of the ground connection employed the code provides for size of conductor as follows:

"The grounding conductor for an alternating current system shall have an ampere capacity not less than one-fifth that of the conductor to which it is attached, but in no case shall the grounding conductor be smaller than No. 8 and it need not be larger than No. 0.

"The insulation and installation of the grounding wire shall conform to all requirements of the Code applying to wires of the voltage of the circuit to which the grounding wire is attached."

A careful consideration of the various methods of grounding, without question, places at the head of the list as most desirable, that of multiple ground connections to an active continuous, metallic, underground water piping system; the multiplicity of grounds being obtained by making the connection at each low-potential service of the electric system. In addition to the advantages of such a method which have been touched upon, the Code provides another which simplifies the grounding problem with respect to equipment, conduit, etc. The rule covering this is as follows:

"The conductor used for grounding a circuit wire may be used also for grounding equipment, conduit, armored cable, metal raceway and the like when the inspection department has granted permission and the secondary system is grounded at the service; otherwise, separate grounding conductors shall be used for grounding the circuit and for grounding the equipment, conduit, armored cable, metal raceway and the like."

Radio Installations in Apartments and Homes

By Robert J. Stull

Radio Specialist, Frank J. Klimm Company, San Francisco, Calif.

THE extreme popularity of radio for home entertainment has resulted in sales of equipment that are unprecedented. Installations have been made in practically every type of residence to be found and the apartment house and hotel as well as the private residence is now certain to have at least one receiving set. These sets have been installed in many cases by experts in radio equipment and are working with great satisfaction. Other sets which have been built by amateurs are also working successfully but there are instances, even in cases where the installation was made by one of experience, where sets are not giving the service which may rightfully be expected. In view of the ever-increasing demand for radio equipment for home use and also because of the many apparently proper methods of installation that will not work, it has been deemed expedient in this article to tell briefly what should and what should not be done when making a radio receiving set installation.

The common types of radio receiving installations may be roughly grouped into two classes. The first class may be considered as the isolated cases, such as in individual homes where there will perhaps not be more than one or two other installations within many blocks.

The second class includes installations where a group of sets are all operating near to each other, as in a closely built up section, and especially such groups as those located in hotels and apartment houses.

The Underwriters' rules governing both classes are the same as regards insulation, location, lighting protection, etc., and are everywhere subject to local ordinance. The rules in San Francisco are briefly given below but an installation should never be made until all ordinance requirements have been met. The rules are as follows:

Antennas must not be erected over street or over wires carrying 600 volts or more, nor be fastened to a pole carrying power wires.

Antennas must be 8 ft. above roofs and must not be fastened to fire escapes.

Antenna wire must be No. 14 or larger.

Antenna and leads must be supported on suitable insulators so that they will not come in electrical contact with anything.

Lead-in must be insulated where it enters building.

Approved lightning arrester must be used where wires enter building, and be suitably grounded.

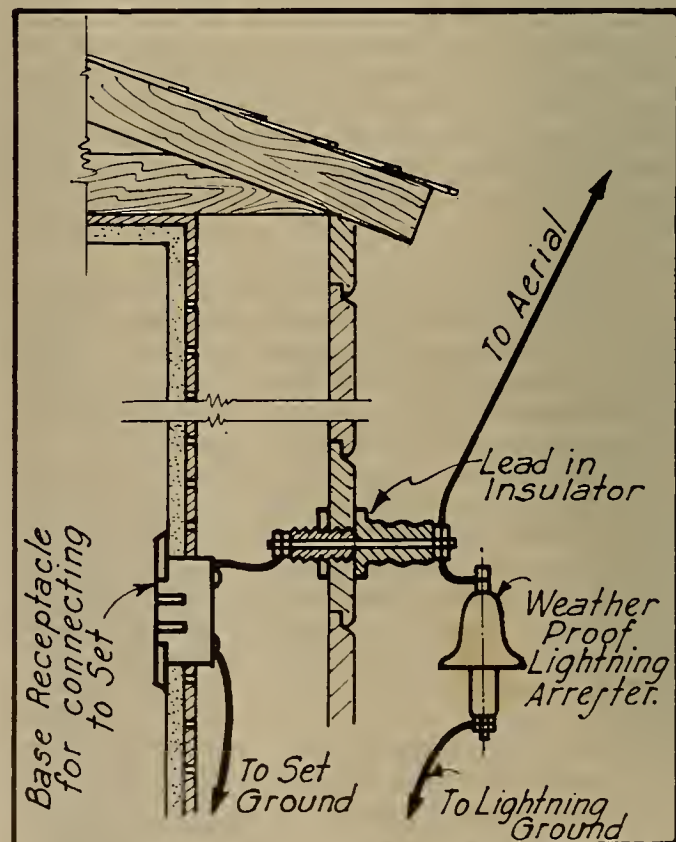
If wires approach within 2 in. of light or power wires, they must be encased in insulating tubing.

THE increasing demand for radio installations in homes and apartment buildings requires that such provision be made for this equipment that it will render the greatest possible satisfaction. Mr. Stull offers suggestions based on experience which, if followed, will help to increase the sale of these devices.

The above rules mean that the lead-in must be approximately as shown in the accompanying sketch.

The types of apparatus and installation, once the aerial and ground are made available, however, differ greatly in the two classes. In the isolated cases any type of receiver may be used, from a simple crystal

set to a multi-tube regenerative set, without interference difficulties arising. In the case of the apartment house or closely settled district, however, the situation is entirely different. A group of aerials on a single roof, each leading to a separate apartment, will operate very unsatisfactorily if the common regenerative set is used, due to one set interfering with others and thus causing howls and squeals. A single aerial used by more than one set is still worse unless a specially designed set made for this purpose is used. In either of the above installations a regenerative receiver in one room will cause



Sketch showing correct method of leading in aerial wire and of insulating for protection in accordance with ordinary requirements. This sketch also shows method of connecting aerial with base receptacle for attaching receiving set.

howling and decrease of signal strength in all the other sets, making satisfactory reception practically impossible.

Another method of construction that is more successful, although with several drawbacks, is to have one central set operated by one person with a suitable system for connecting loud speakers at the various places desired. Several plugging-in systems for this purpose are now available.

The inherent difficulties of such a system are at once seen. The attendant at the radio set must be available at all times to satisfy the demands of a large number of users. The flexibility of an individual radio set is lost; either all of the listeners must hear the same broadcaster or nothing at all. Some places have installed two complete sets of radio with aerials well separated from each other so as to give a choice of two broadcasting sources, but here the advantage of flexibility is but slightly better.

In making up such a system several points should be borne in mind. Each outlet for a loud speaker should be so arranged, with a contact and coil, that the circuit characteristics as a whole are the same whether a horn is plugged in or not. Provision must be made for a power amplifier of sufficient current carrying capacity to supply all loud speakers.

Other types of sets are the non-regenerative tube set or the aperiodic set which, although it uses regeneration, has means for preventing local oscillations from being re-radiated from its own aerial.

This type works very well on grouped aerials and even on the same aerial except that the use of a large number will probably reduce the signal strength considerably. The last type of receiver and the one probably best suited for all conditions is the non-regenerative or the non-radiating regenerative set using enough stages of amplification to give loud signals on a loop antenna, or a small inside aerial in the room itself. It is possible, with such a set, to receive on a loop inside of a building with a non-regenerative set without any of the above disadvantages.

In order to give briefly some of the more common faults of antenna installations and to obviate the possibility of these things occurring to readers of this article, a few suggestions are here given for guidance in putting in a set. These are the major points only and are subject to individual discretion.

All wires should be as straight as possible. The total length should not exceed 150 ft. Most sets work better on a much shorter aerial.

Ground leads should be short and need not be insulated unless of great length. Aerials or leads should not run parallel to power or light lines or near to grounded surfaces, such as tin roofs, conduits or water pipes.

Lead-in insulators should be water-tight or slope toward outside to prevent rain from running along the wire to the set. Never install aerial or lead wires inside of conduit or other conducting material even though insulated from it.

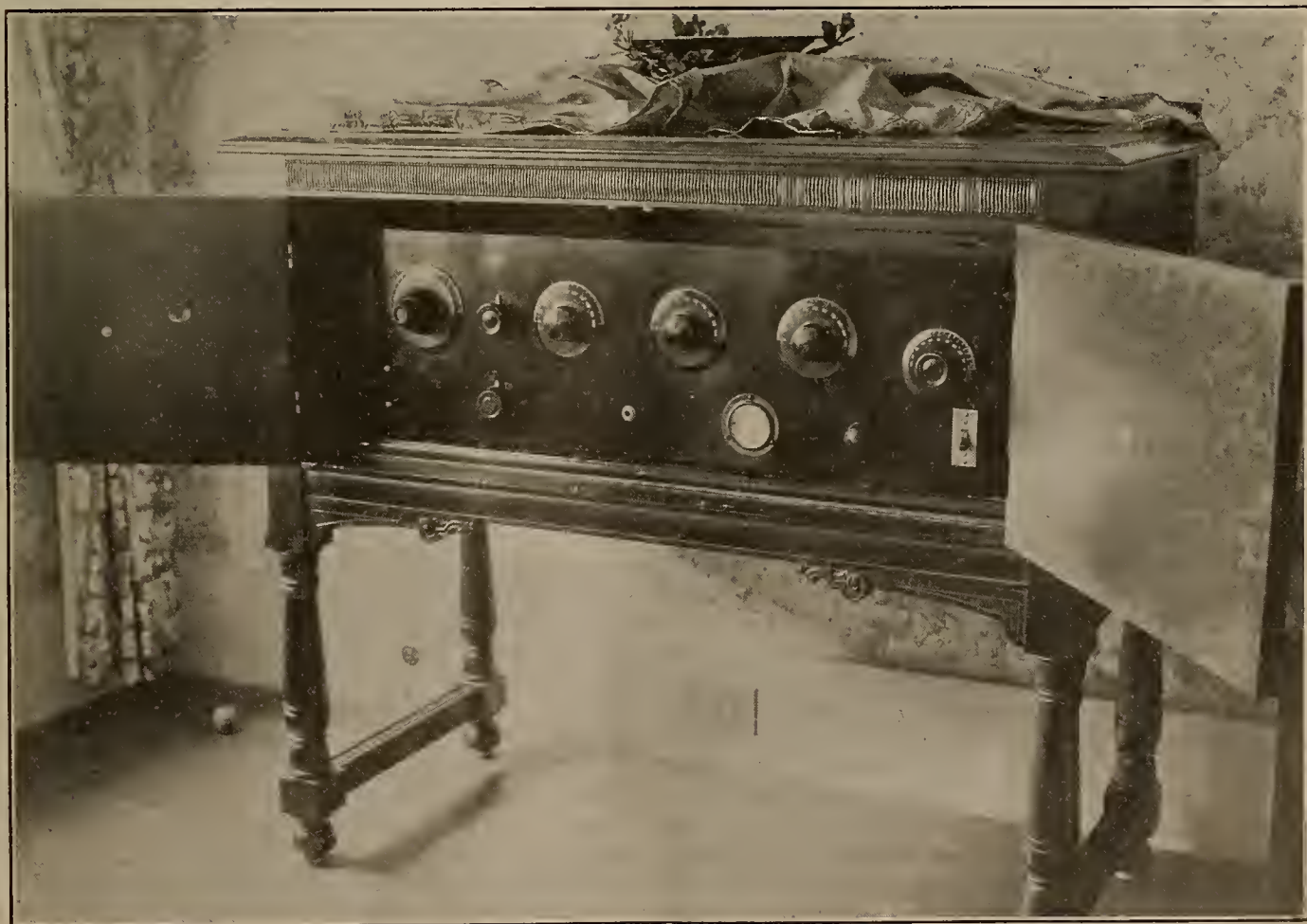


Illustration of a non-regenerative radio receiving set

Has the Pacific Coast Jobber Problems That Are His Alone?

By E. A. Kincaid

Associate Professor of Commerce, McIntyre School of Commerce, University of Virginia

IN view of the necessity for the western jobber to fill orders both large and small and his inability to shunt any of the small orders to the manufacturer, and in further view of the fact that the average dealer buys only in small orders, it is clear that Pacific Coast jobbers must do a good deal of unprofitable business. In fact, it is maintained by western jobbers that fully 50 per cent of the orders filled for dealers are handled at a loss. That much of the business received from dealers is handled at a loss by large jobbing houses cannot be questioned. The large jobbers have a much more elaborate organization and every sale involves many operations, in some cases as high as thirty-six. For the small jobbers the cost of handling an individual transaction at every stage as it passes through the house is much less, for the simple reason that the number of operations is much less.

In dealing with this problem jobbers have experimented with various systems of discounts. If a sliding scale discount is adopted the dealer is encouraged to increase the amount of his orders, but this may lead to overstocking on the part of the dealer. Thus, there results the danger that the dealer may be forced into bankruptcy because of inability to move his stock with sufficient rapidity to meet his bills. On the other hand, such a system of discounts often puts the small buyer at a disadvantage with his more powerful competitor with respect to prices. For this reason the dealer may be led to buy from the small jobber whose methods are irregular and subversive of the best interests of the electrical business. Thus, any method of reducing the volume of small orders may encourage the jobber whose methods are likely to demoralize trade conditions. Here is a problem for the jobber which presents marked difficulties. No matter which way it is approached there are complexities.

One other aspect of this problem requires attention. If the jobber discourages the dealer from coming to him with small orders and these are then given to the irregular jobber, then the latter is apt to ask the dealer for some or all of his good business and, moreover, get it. So it follows that any effort the jobber may make to cope with the problem of small orders may in turn bring on the other and more serious problems. With respect to this problem there are two observations which may be made. The jobber must care for the small orders or assume the risk of breaking the dealer or driving

THAT the reduction of production and distribution costs is the best way to expand the electrical market in any territory, is Mr. Kincaid's theory. This problem falls upon the shoulders of the dealer, jobber and manufacturer and in this article the position of the Pacific Coast jobber is considered.

him to some cut-rate competitor. Of the two alternatives it would seem better for the jobber to care for the small order at a loss. All merchants must do some business at a loss and it is a question whether it is wise to eliminate the business which is unprofitable. For it is a fact that some of this unprofitable business draws other profitable business which could not otherwise be had. In the next place, both wholesale and retail merchants have to do business on the basis of what the traffic will bear. Prices are more often fixed on that basis than any other. The loss on some lines which must be carried has to be met on other and more profitable lines.

The Position of the Irregular Jobber

In the next place, it is a fact that jobbers have to contend with competitors whose practices may be described as piratical. A jobber who lives by preying upon the business methods designed to establish the jobbing business along sound lines may very properly be described as a pirate. If the jobber follows merchandising methods which result in his losing business to his unethical competitors, these gentlemen are then enabled to sell more goods of low standards. Here we face a difficult question concerning which there is much division of opinion. In opposition to the point of view just expressed there are those who maintain that irregular jobbers often carry high-grade stocks which have not been able to find distribution at the hands of regular jobbers. Again, it is maintained that not every consumer should be encouraged to buy high-grade merchandise. For example, why should a man who is building a cheap and inexpensive house install fixtures which are entirely out of keeping with the character of the house? Furthermore, should not the regular jobber be content to leave low-grade merchandise and unethical jobbers to the tender mercies of competition? Is not the regular jobber in a position to await the working out of the economic forces which will determine what will survive? To this the jobber may reply that these economic forces are long-run forces and that he himself is concerned with the present.

All this is true enough. But the fact remains that any effort to tamper with the economic laws is sure to be disastrous in the end and may be illegal. Certainly it may be said that society cannot permit strong and regular jobbers to throttle weak and irregular ones, if by so doing new and improved but

relatively unknown merchandise is lost to the consuming public. A stabilized jobbing business is not as important to society as the certainty that improved methods and goods will find a way to market. For my own part, I am half persuaded that irregular jobbers afford an essential way for the survival of improved products. Many a manufacturer at first produces inferior goods in order to find a market and then raises his standards as his position is strengthened, just as many regular jobbers once followed merchandising methods which they do not approve of now.

Low Priced Material an Asset or Liability?

The jobber's problem of small orders and driving business to irregular competitors has yet another important aspect. Admitting that many of the irregular jobbers do carry inferior goods, it follows that they must cater to those dealers and contractors who install inferior fixtures and do low-grade wiring. The curbstone variety of contractor underbids his competitor because he installs inferior goods and reduces the number of outlets for current. These two practices appear to go hand in hand. If it were not for the pirate jobber the pirate contractor would find it more difficult to underbid his competitor by offering high standards of workmanship and materials. The under-bidding is hard on the regular contractor and the regular dealer and it is equally hard on the power company. But the question arises as to the effect of doing away with this type of competition. Does it not have the effect of lowering costs of wiring and fixtures and thus make it possible for people to consume these goods, and current as well, who would otherwise not do so? If this is so, does it not follow that the power company gains in one way and loses in another? Is not the presence of this sort of competition, so much deplored by regulars in the electrical field, doing much to bring about improved marketing and merchandising methods as well as more economical processes of manufacturing on the part of those who count themselves regular in that they live up to a higher standard of business? The reduction of production and distributing costs is the best way to expand the electrical market and thus to stabilize it and certainly is the most effective way of putting pirates out of business. Moreover, it is a method that makes resort to any form of coercion unnecessary. That in itself is worth something.

Buying a Problem of the Retailer

To revert once more to the jobber's problem of handling unprofitable business from dealers, yet another implication is there involved; it is certain that the jobber's relations with the dealer will have much to do with the ability of the latter to remain in business. The question of just how the dealer buys is one of fundamental importance to the jobber. The rate of turnover of stock is the ratio of net sales and the average inventory in terms of cost. The practice of buying in large quantities in order to obtain a higher rate of discount leads to accumulation of stock and this cuts down the rate of turnover. The result is that the dealer's profits are reduced.

It is not uncommon to find dealers in any line of business who fully understand that buying is just as important as selling, but one could not very well expect the average contractor-dealer to grasp this matter. Therefore, it falls upon the jobber to carry on educational work among his customers with respect to the basic principles of merchandising. Some one must supply the necessary knowledge of merchandising and the burden of the lack of such information on the part of the dealer falls most heavily upon the jobber. He cannot successfully take the stand, in explaining the distribution situation to manufacturers, that appliance business does not pay because of the poor standard of merchandising ability that exists among dealers. To do so only amounts to an admission that he has not much to offer to the manufacturer in the way of outlets for goods. To admit so much simply leads the manufacturer to understand that jobber distribution has become fundamentally weak. And it must be said that manufacturers are not without a remedy in this matter. There is too much experience available in other industrial fields upon which they may draw to permit of any such a delusion.

To revert to the practice of allowing weak dealers to return goods to the jobber because they have not or cannot be sold, it may be said that such a practice is at once an admission on the part of those jobbers, who allow such a practice, that they are really carrying the dealer. Perhaps it is better for the jobber to allow the dealer to return goods and thus reduce the balance due the jobber than to drive the dealer into bankruptcy. But the choice between the two alternatives is in no sense pleasing. One must naturally ask the question, When are goods sold to dealers to be considered as sold? How long can the electrical industry put up with such practices? A jobbing business has as its foundation its dealer outlets and others. What kind of a jobbing business can be constructed on such a foundation? It is little wonder that jobbers are so much at war among themselves, that there is so much confusion in trade relations and so little harmony.

The Jobber's Relations with the Manufacturer

When all of these matters are fully thought over from the point of view of the jobber, it becomes apparent that his chief concern is to see to it that those conditions which encourage manufacturers to go over the head of the jobber do not exist. In this connection it may be well to consider the conditions that induce manufacturers to take such a step. In the first place, the manufacturer is willing enough to dispense with jobber distribution if he can find a better way to market. This means that the manufacturer will adhere to a marketing system that will give him (a) a better volume of sales and (b) reduce the costs of distribution. He will also be influenced to take this step if he can (c) make his advertising more effective and (d) maintain a better control of resale prices. Furthermore, he will be interested in such a step if thereby (e) he can better service the goods that he sells and thus increase the good will of consumers with respect to his line. Finally, (f)

he must consider such a step if he can in that way more effectively co-ordinate the operations of his factory with his sales organization. A mere enumeration should be a sufficient statement of the situation of the jobber. From these points it becomes apparent what he must do in order to maintain his place in the distributive system. To the extent that the jobber meets these problems, just to that extent will friction between him and the manufacturer be reduced. The question, therefore, of the ultimate status of the jobber in the distributive system is being worked out day by day by the jobbers actually in business.

The Manufacturers' Position in the Future

The fact that manufacturers are now distributing by means of jobbers does not carry with it any guarantee as to the future. There is an evolution in these matters as in all others and jobbers now in business are shaping their own ends and the future of wholesale distribution in the electrical field, whether they realize it or not. The manufacturer is almost continually confronted with problems growing out of his relations with the jobbing system. For one thing, it is not uncommon for manufacturers to prefer jobber distribution, but find the number of jobbers in a given center altogether too few. This is often the situation in smaller cities. Is the manufacturer to ignore the lost sales opportunities in such places in order to maintain his relations with jobbers on a regular basis? If not, then is he not justified in setting up some dealer there as a jobber? Now, on the other hand, it appears that there are too many jobbers in some of the larger cities of the country. As a result there may be excessive competition among jobbers. This situation has resulted in the organization of jobbers into trade organizations or price-cutting where such associations fail of their purpose. It has been suggested that a better organization of the electrical markets in smaller cities would remove some of the tension in the larger cities. With respect to this matter one must adopt one or the other of two alternative conclusions. There is maladjustment of the distributive system for electrical goods or else there is an actual state of over-production. Now as a matter of fact, it is fairly certain that both conditions exist. With respect to the first, it must be obvious that manufacturers will be compelled either to open up any jobbing centers that jobbers themselves fail to develop or resort to selling directly to dealers and others. With respect to the second, it is only necessary to understand that over-production is but another name for under-consumption, for there is no such thing as absolute over-production. There may be over-production on the basis of prices that are asked for electrical goods of all sorts. That is to say, there may be more goods than consumers will absorb at existing prices. Whenever price-cutting is general, it is reasonable to assume that this is the actual condition.

The Remedy for Price-Cutting

The remedy for price-cutting is a lower cost of production and lower costs of distribution. The solution of this problem falls upon the manufacturer as

well as upon distributors. The reduction of these costs will make possible a lower price and an expansion of the electrical market. When goods move in sufficient volume the chief cause of price-cutting has been wiped out. The price-cutter knows that he may so expand his sales by the practice that the increased volume will offset the reduced margin of profits. To this it may be replied that there is a limit as to what the market will absorb at any price. There is a saturation point, but it is in the control of the manufacturers and distributors. Thus one is led to conclude that the stabilization of the electrical market is in the hands of the manufacturers and distributors. Here the marginal concern, whether manufacturer or distributor, will play a vital part, for the marginal producer is the most efficient producer and under the competitive system rival concerns will have to meet his price. Eventually there will be developed standardized units of production and distribution and these will operate on the basis of the law of balanced return. That is to say the electrical industry is still young, when taken as a whole, and the most effective combinations of labor and capital have not been achieved in many plants, whether manufacturing or distributing plants. Until this movement has gone much further than at present, stabilization of the electrical industry is impossible. But let it be clearly understood that stabilization is being worked out and the standard for its achievement is the marginal manufacturer and the marginal producer of today.

Sales Volume Solves Margin Problem

When the jobbers and dealers complain about margins one is confronted with but another aspect of this same problem. There is such a thing as a margin that is too narrow, but when distributors complain about margins, manufacturers respond that the remedy is with the merchant. He must expand his volume of sales or else reduce his operating expenses. More service, better advertising, superior locations, improved buying methods tend to reduce that part of the margin that covers the costs of selling, while increased volume of sales will make possible a reduction in that part of the margin that covers profits. The expansion of the margin tends to make it possible for the less efficient distributors to survive, when, perhaps, they ought to perish. Is the manufacturer justified in removing the pressure from distributors by increasing the margins when such pressure is one of the chief inducements to efficiency? The manufacturer wants a wider market and he realizes that it is not to be attained by increasing the margins but by improving distributive processes. Margins can be made so wide that existing distributors will be able to make profits but conditions are not improved thereby, for the reason that other and less efficient distributors are induced to enter the business and they, in turn, will complain that margins are too narrow.

Broaden Electrical Market

If electrical goods are ever to become staples instead of luxuries, then the goods must be placed within reach of a sufficient number of consumers so that it may be said that the appeal is not made to a

class market. The production of luxuries may be stabilized on the basis of a class market, but a class market is a narrow market and a narrow market will not solve the problems of central stations and manufacturers. Any effort to stabilize prices at a level which will prevent the greatest number of persons from becoming consumers will throw the interests of power companies and central stations out of harmony with those of manufacturers and distributors and will lead to combination within the industry. Such combination will be by means of holding companies with integration of steps in the industry all the way from the manufacture and distribution of electrical products to the manufacture and distribution of current.

The fact is that such integration has already gone far and is growing steadily and it is simply the outgrowth of a clear understanding on the part of certain very able men that the inter-relation of the branches of the electrical industry is very close, that there is much of interdependence, which if properly understood can be utilized to the greatest good of the industry. Any effort to stabilize the industry at some higher level than the greatest possibilities of the market will prove of no more than temporary success. In the long run associations working to such an end are doomed to failure because their success would mean the blocking of progress within the industry as a whole. New producers and new distributors cannot be kept out of the market and any effort to keep them out is anti-social and uneconomic. Associations designed to fix prices must fail because they do not cure the disease. They are merely trifling with the symptoms. Where price-fixing is resorted to, whether by distributors or manufacturers and succeeds, the result is the backing up of production and operations on the basis of a narrower market. Other concerns cannot be kept from attempting to reach this market that is thus lost and so the device is destroyed by what it lives upon.

Three Questions Must Be Solved

A study of the relations of electrical manufacturers and jobbers points to some definite conclusions. There are three sets of bad conditions within the industry. (a) There has been an over-expansion of production on the part of manufacturers. They have sought to place production on the most profitable basis. That is to say, they have sought to expand production to that point which will permit of the lowest cost per unit of production. There has also been an increase in the number of establishments. This has resulted in giving those factories that are most effectively organized an advantage in the matter of price and thus other manufacturers have sought out and found ways to market that are less expensive but unusual and irregular in the opinion of the trade. (b) On the other hand, we have the very inadequate dealer outlets. (c) Between these two situations the jobber has been groping about more or less haphazardly. He has sought remedies by cooperation with manufacturers' associations on the one hand and the formation of associations of his own on the other. It has been thought that better understanding between these two groups

would achieve certain promising results, but there is but little to justify this point of view when all that has been accomplished in Pacific Coast territory is taken into account. I am not here entering upon any criticism of such associations for their intentions are undoubtedly good. I am merely saying that they have not achieved constructive results worth while.

The solution of the problems growing out of the relations of the jobber with the manufacturer and the dealer will come with more light in dark places. There must be some really scientific studies made in the field of factory costs of production and just as much work must be done in the field of the costs of distribution. As to dealer outlets, it would be worth while for manufacturers and jobbers to cooperate in the establishment and operation of typical retail establishments and then study them. The California Fruit Growers' Exchange had a problem of this sort with respect to the market for orange juice and lemon juice. It found that soda fountains were selling synthetic products rather than the real thing. It wanted to find out why. To do so it set up and operated a fountain and studied the costs of doing business, the reaction of consumers and all other factors. As a result it solved this particular problem. There is no use to resort to calling names, for the manufacturers, taken as a whole, cannot establish the necessary retail outlets. Neither can distributors move goods that cost too much. A simplified system of distribution does not call for elimination of the jobber, but it does call for reduction of costs all the way up and down the line.

India Wants Electrical Goods

RECENT developments in India seem to indicate that the demand for electrical goods will be on an unprecedented scale in the near future, and the importance of having stocks available at competitive prices in the principal port cities of India cannot be too strongly emphasized if American manufacturers are to secure a fair proportion of this trade, according to a report of the United States Trade Commissioner's office in Calcutta.

During the past year, an electric plant for lighting purposes was installed in the city of Agra and the Metropolitan Vickers Company is at present engaged in building systems in the towns of Gondal and Morvi. The Mendi hydroelectric scheme in the Punjab, the Hyderabad hydroelectric and irrigation project in the Nizam's state, and the Nilgiri, Pykara and Periyar hydroelectric power projects in the Madras Presidency are bound to create a demand for all classes of electrical equipment.

According to the report, English engineering houses are well established in the field. American manufacturers without representation in India are at a disadvantage in this respect. It is essential that American manufacturers either have their own branch offices in India or arrange with local engineering firms of good standing to act as their representatives, particularly as the policy of the Indian Government tends more and more toward the purchase of equipment locally.



Electrical Construction

By E. Earl Browne

THE misuse of proper terms descriptive of switching, control and protective apparatus has been responsible for much of the confusion that often exists. When orders for this class of material are placed or when estimating or laying out a job it is easy to correct this misunderstanding if the follow-

ing definitions from "Standards of the A.I.E.E." are noted and applied:—

Switch.—A switch is a device for making, breaking or changing the connections in an electric circuit. (A switch should not be called a controller.)

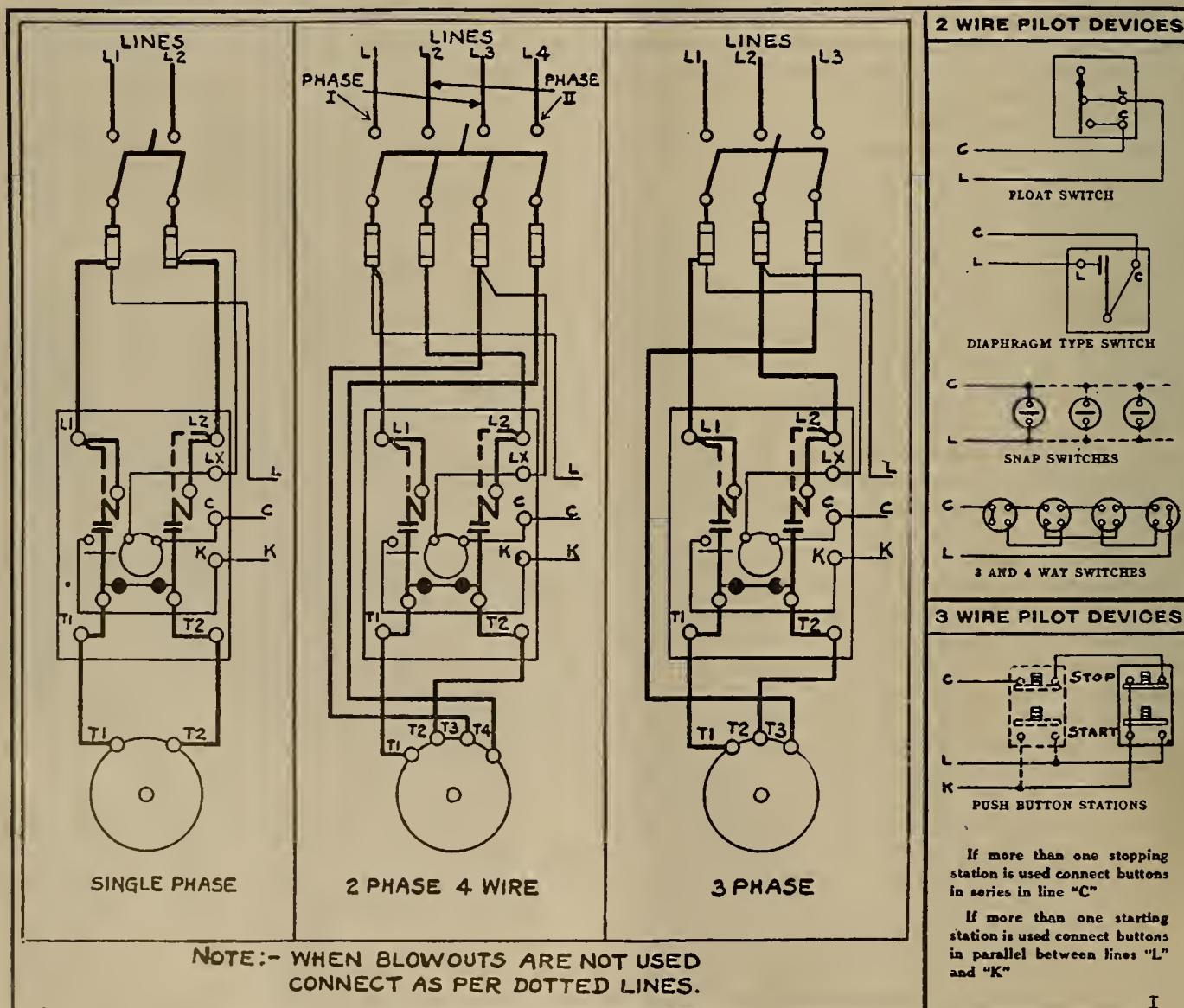


Fig. 1—Connections for Cutler-Hammer a.c. double pole magnet switches, two and three-wire control.
Bulletin No. 9580 and 9600.

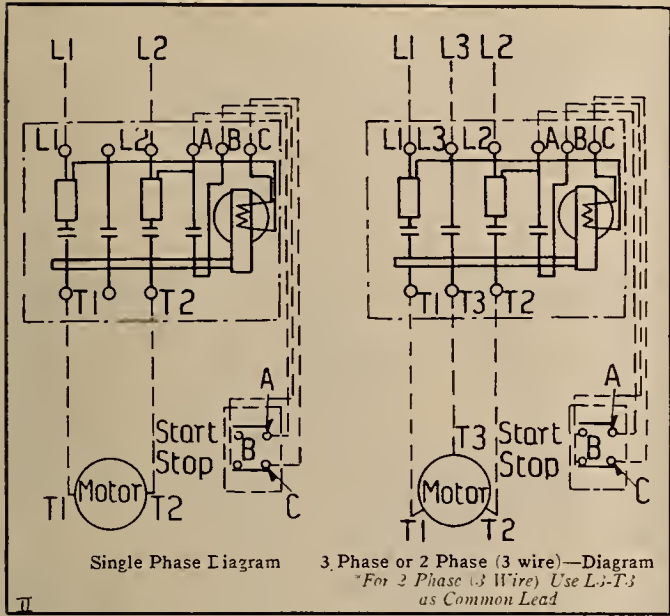


Fig. 2—Connections for Westinghouse Type F three-pole automatic starter.

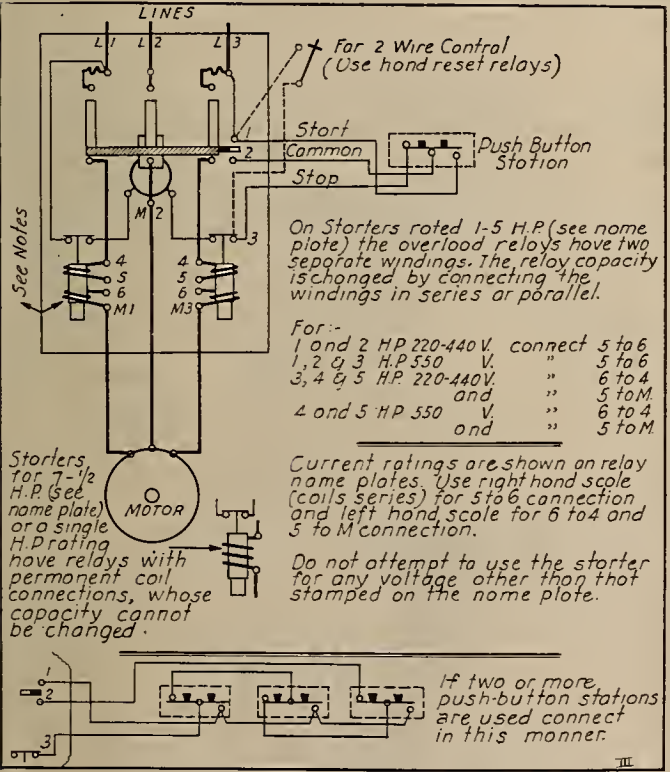


Fig. 3—Wiring diagram for Allen-Bradley Type J-1552, size E, Form E, a.c. automatic motor starting switch three-pole, three-phase.

Electric Controller.—An electric controller is a device, or group of devices, which is designed to control in some predetermined manner the operation of the apparatus to which it is connected.

Motor Starter.—A motor starter is an electric controller designed for accelerating a motor to normal speed in one direction of rotation. (A device designed for starting a motor in either direction of rotation is called a controller.)

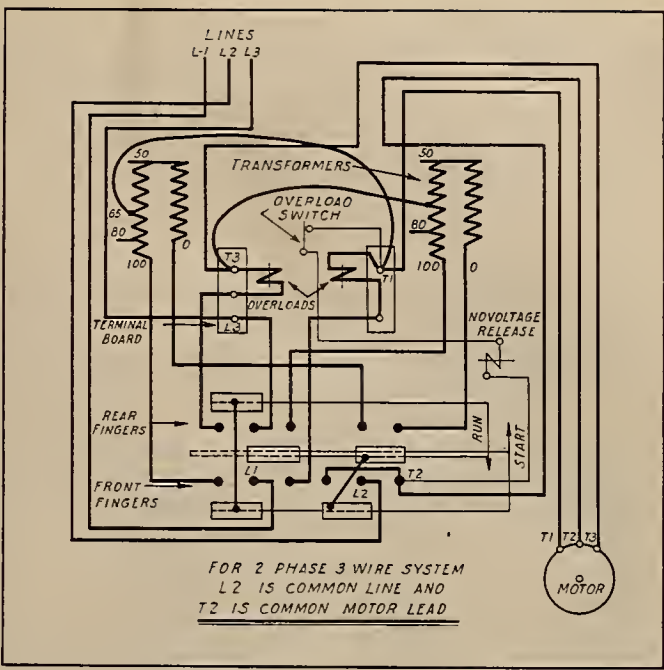


Fig. 4—Connections for Cutler-Hammer potential starter with overload and no-voltage release, for two-phase, three-wire or three-phase service.

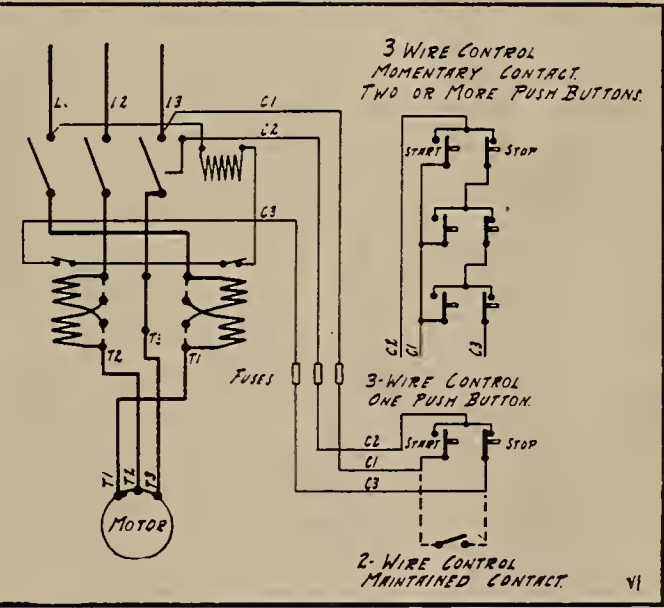


Fig. 6—Wiring diagram for Industrial Controller Company a.c. automatic starter class 8527, using three-phase service. For two-phase, three-wire system use terminals L3 and T3 for the common return wire and connect leads T3 and T4 together. For two-phase four-wire system connect line L4 straight through to T4 on motor.

Automatic Motor Starter.—An automatic motor starter is a motor starter designed to automatically control the acceleration of a motor.

Auto-Transformer Motor Starter.—An auto-transformer motor starter is a motor starter having an auto-transformer to furnish a reduced voltage for starting. The device includes the necessary switching mechanism and is frequently called a compensator or auto starter.

Under-Voltage or Low-Voltage Release Switching and Control Apparatus.—Under-voltage or low-voltage release switching and control apparatus is apparatus which, on the reduction or failure of voltage, operates to cause the interruption of power to the main circuit, but which does not prevent the

Figs. 1 to 11, inclusive, show some of the diagrams of connections for various makes of automatic a.c. motor starters. In wiring for these devices the contractor should keep in mind the points brought out in the article on Electrical Construction that appeared in the Feb. 1, 1924, issue of the Journal of

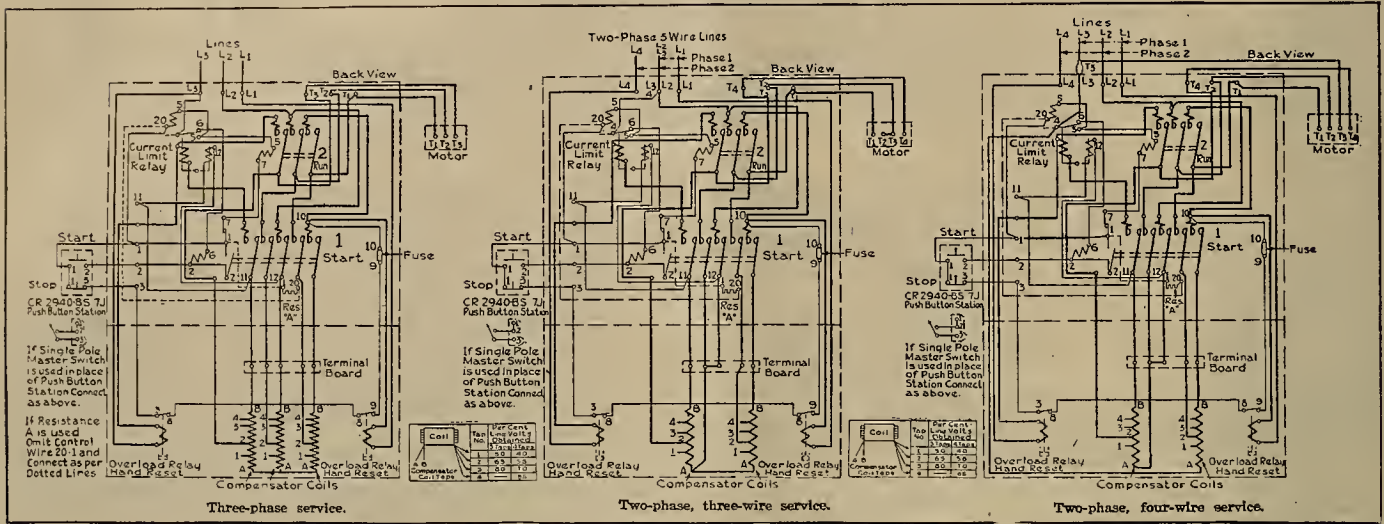


Fig. 5—Connections for General Electric CR7052-A1 automatic starting compensator.

re-establishment of the main circuit on return of voltage.

Under-Voltage or Low-Voltage Protection Switching and Control Apparatus.—Under-voltage

Electricity, particularly in reference to location of and type of lock-out switches to comply with national and local safety laws.

The installation of a proper automatic starter for all motors in place of the manual type for start-

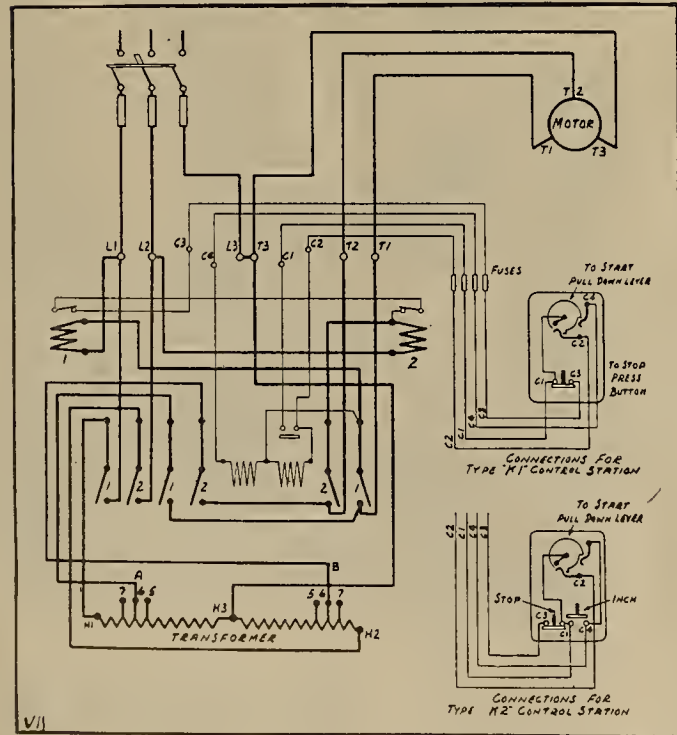


Fig. 7—Wiring diagram for Industrial Controller Company three-phase automatic compensator, with one Type K-1 or K-2 control station.

or low-voltage protection switching and control apparatus is apparatus which, on the reduction or failure of voltage, operates to cause and maintain the interruption of power to the main circuit.

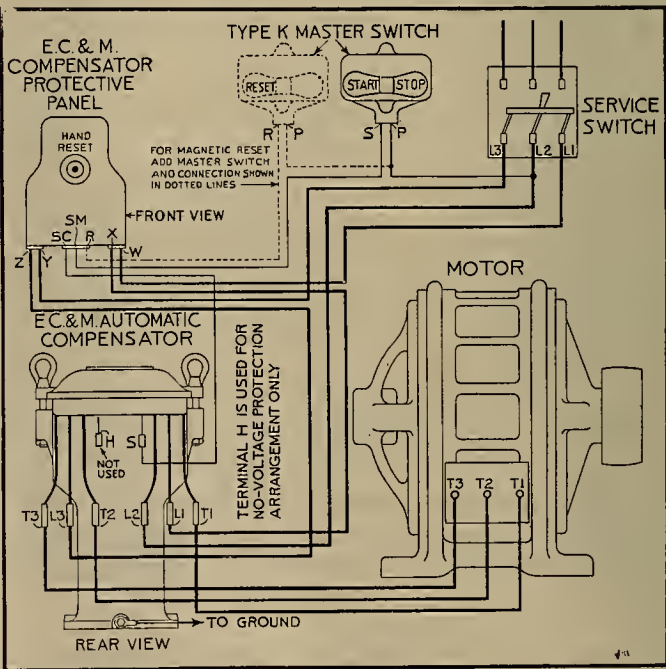


Fig. 8—Connection diagram for E.C.&M. a.c. automatic three-phase compensator arranged for overload and no-voltage release. (Use this diagram for two-phase, three-wire system with L2 as the common return.)

ing small induction motors driving machine tools, pumps, compressors and other machinery with individual or small motor drive has become general. The squirrel cage motor for polyphase circuits and the

repulsion induction type motor for single phase circuits may be started by simply connecting them direct to the supply lines without any starting resistance or transformer. This method of starting requires 500 to 600 per cent of full load current and unless the ordinary hand starter is given a few seconds between "start" and "run" positions operators will of course blow the fuse on the "motor protection circuit" and cause a shutdown until the fuse is replaced. These delays cost money and can be nearly entirely eliminated by means of the automatic

starter which has a sufficient time-element to give nearly 100 per cent perfect service and thereby save all delays due to blown fuses.

In addition to connecting the motor to the supply lines, the starting devices should give full protection to the motor circuit against continuous excessive current, failure of the voltage, and in the poly-phase circuits against running with one line open; i.e., single phase.

Many starters do not provide a complete protection on this latter point as it is possible for one line to open and with the low-voltage protection coil across the other phase the switch will still be held closed and thereby burn out the motor.

An automatic switch can be installed anywhere that is convenient and all that is necessary is the push button attached to or suspended above the machine. A magnetically operated switch is positive in making and breaking the circuit and there is no

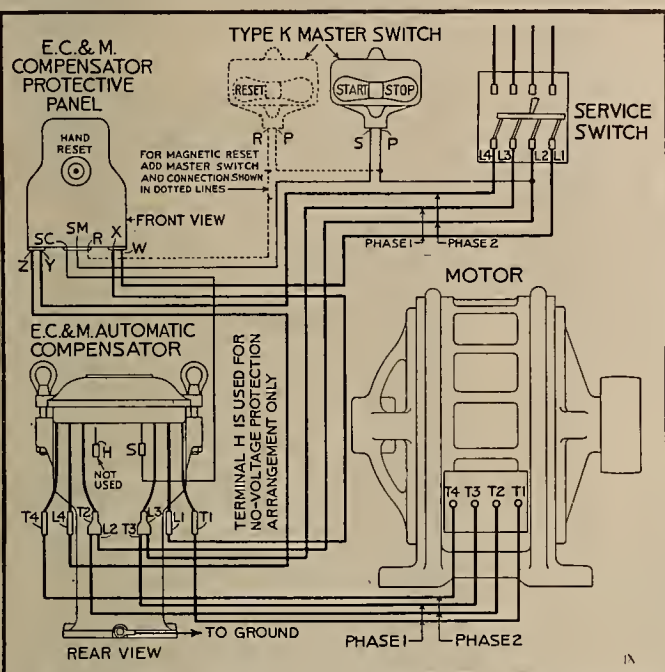


Fig. 9—Connection diagram for E.C.&M. a.c. two-phase compensator arranged for no-voltage release and overload. (Use three-phase diagram for two-phase, three-wire system.)

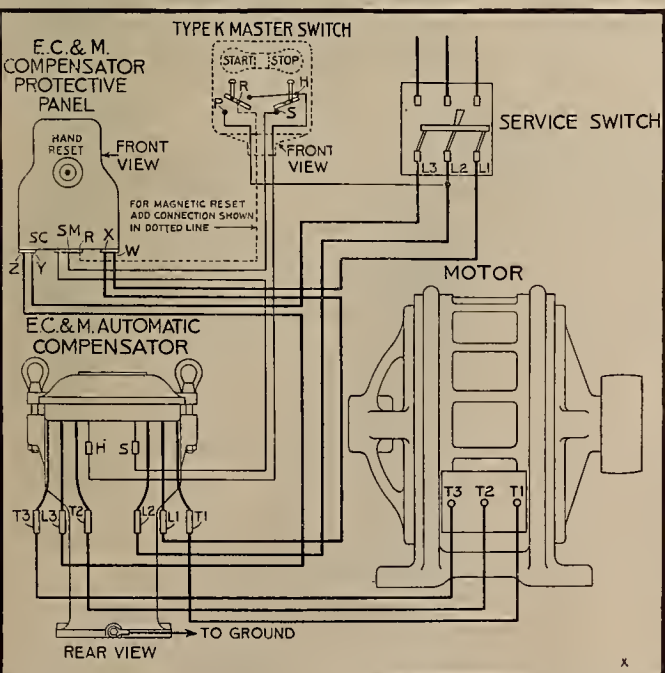


Fig. 10—Connection diagram for E.C.&M. a.c. three-phase compensator arranged for overload and no-voltage protection. (Use this diagram for two-phase, three-wire system with L2 as the common return.)

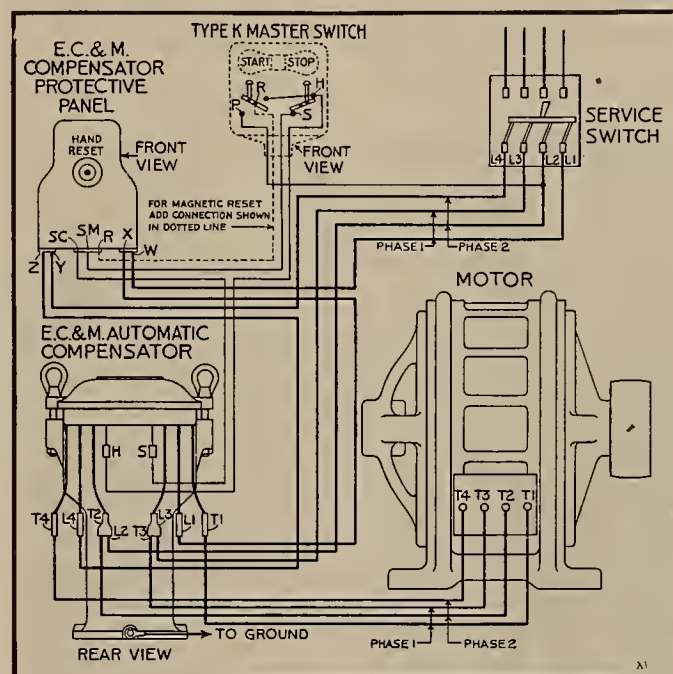


Fig. 11—Connection diagram for E.C.&M. a.c. two-phase compensator arranged for no-voltage protection. (Use three-phase diagram for two-phase, three-wire system.)

danger of excessive arcing which occurs when the switch is closed or opened manually with a hesitating action.

On motors of the squirrel cage type above 7½ hp., it is necessary to start with either an auto-transformer starter or by inserting resistance in the line. This latter type is particularly adapted for such service as fans, etc., which require that the power to drive them increase faster than their speed. The compensator type, however, has the advantage in the case of a motor which is loaded so that it will start when 50 per cent of full potential is applied; in this case the current taken from the line is 50 per cent of that in the motor when a compensator is used and 100 per cent when a resistance starter is used. A wound-rotor motor is started with full resistance in the secondary circuit, and the resistance is cut out in several steps.

STATISTICAL REPORT

STATISTICAL REPORT NO. _____

NO. _____ FORM 304-1-25-15M	DEPARTMENT _____		MONTH ENDING _____		192... _____	
	CURRENT MONTH		SAME MONTH LAST YEAR		YEAR-TO-DATE THIS YEAR	
ITEMS	AMOUNT	PER CENT	AMOUNT	PER CENT	AMOUNT	PER CENT
Gross Sales						
Less Returns						
Net Sales						
Less Cost of Sales						
Gross Profit						
Less Total Expenses						
Net Operating Profit						
Brokerage Profit						
Mdse. Rental Profit						
Discounts Earned						
Total Net Profit						
Beginning Inventory						
Purchases						
Cost of Sales						
Ending Inventory						
Average Inventory						
Desired Inventory						
Rate of Turnover						
Actual Rate per Annum						
Required Rate per Annum						
Consigned Mdse.						
Mdse. in Transit						
Outstanding Orders						
Brokerage Sales						
Hold Orders at Retail						

Department managers are notified of their standing on the form reproduced above.

Department Store Methods an Aid in Checking Dealers' Costs

It is not only necessary to have somewhere in the accounting department of every merchandising business the necessary figures upon which an analysis of the business can be based—it is important to have those figures in such a shape that they most effectively tell the story and offer a desirable basis for judgment in deciding on future courses. The department store is past master in the analysis of its business. Such an institution is so large, with so many factors involved that, were not a close study made of every detail, it would be possible for a leak to exist somewhere which would do much to cancel the profits made in another department. A complete analysis is made of the business monthly in consequence and present conditions checked with those of the corresponding month of the past year and with the record of the present year to date.

In this connection two printed forms used by a successful western department store with a large electrical department are of interest as illustrating what factors are considered. The care and detail with which the problem is studied may suggest a similar analysis of his own problems to some electrical dealer who now judges the state of his business largely by his bank balance.

The first of these forms is an analysis of the overhead costs made each month by the general accounting department and forwarded to each department. It includes the following items:

- Traveling
- Spiffs (these are commissions allowed one department by another)
- Meals
- Parcel post, freight, express, etc.
- Advertising (direct)
- Supplies
- Repairs to merchandise
- Repairs to fixtures and equipment
- Repairs to building
- Stationery
- Heat, light, water and power
- Postage
- Subscriptions and publications

- Allow by purchase
- Rent
- Telegrams
- Buyers' expense
- Phones
- Association dues
- Merchandise exp.
- Depreciation
- Extra cartage
- Pay roll credits
- Pay roll
- Exchange transfers
- Contract furniture transfers
- Bad accounts
- Store taxes and insurance
- Purchasing
- Garage
- Utility, phones and elevators
- Photographic
- Correspondence
- Factory rent
- Factory receiving room
- Factory polishing room
- Factory general
- Delivery
- Workroom or shop
- Merchandise office and store records
- Accounts payable
- Accounts receivable

Form 304-2-25M

ITEMIZED EXPENSE REPORT

STATISTICAL REPORT NO. _____

DEPT. NO. _____		DEPARTMENT _____		MONTH ENDING _____		192... _____	
EXPENSE CLASSIFICATION		CURRENT MONTH		YEAR TO DATE		EXPENSE CLASSIFICATION	
Traveling						Forward	
Spiffs						Pay Roll	
Meals						Exchange Transfers	
P.P., Frt., Express, etc.						Contract Furn. Transfers	
Advertising (Direct)						Bad Accounts	
Supplies						Store Taxes & Insurance	
Repairs to Mdse.						Purchasing	
Repairs to F & E						Garage	
Repairs to Building						Utility, Phones, & Elevators	
Stationery						Photographic	
H. L. F. & W.						Correspondence	
Postage						Factory Rent	
Subs. & Publ.						Receiving Room	
Allow by Purchase						Polishing Room	
Rent						General	
Telegrams						Delivery	
Buyers Expense						Workroom or Shop	
Phones						Mdse. Office & Store Rec.	
Association Dues						Accounts Payable	
Mdse. Exp.						Receivable	
Depreciation						Credit, Collection & Service	
Extra Cartage						Sales Service & Soliciting	
Pay Roll Credits						Advertising (Indirect)	
Miscellaneous						Window Display	
Forward						Mail Order	
						Contract Sales Service	
						Interior Dec. Service	
						Furniture Repair Service	
						Administrative	
						Interest on Investment	
						Inventory Adjustment	
						Carrying Charges	
						Total Expense	

All departmental cost items are recorded on forms of this character.

- Credit, collection and service
- Sales service and soliciting
- Advertising (indirect)
- Window display
- Mail order
- Contract sales service
- Interior decorating service
- Furniture decorating service
- Furniture repair service
- Administrative
- Interest on investment
- Inventory adjustment
- Carrying charges
- Miscellaneous.

These figures are given for the current month and for the year to date. Some of them, of course, are fixed sums prorated against each department and entered mechanically every month. Other items vary with the particular expenditures of the month or are not entered at all. Not all of them are appropriate to a small business. The main details, however, are factors which concern every merchant, and their monthly study would prove profitable to the specialty shop as well as to the large store electrical department.

In addition to this study of the overhead charges, the department head is provided monthly with a statement of exactly how this department stands in sales, percentage of returns, total expenses and profits. There is also a section here devoted to inventory, another which gives the rate of turnover in close proximity with another figure which gives the required rate of turnover. A statement of consigned merchandise, merchandise in transit and outstanding orders completes the picture. All these figures are given for the current month, for the corresponding month of the past year, for the year to date this year and for the year to date last year.

With this complete picture before him of the state of his business, it is obvious that the department chief can put his finger at once on any weak spots. No "leak" can go long undiscovered and, on the other hand, successful methods can be duly credited with their success and their application extended. It is obvious that the merchant so furnished with the knowledge of his business has a far better chance of success than the man who works in the dark.

Questions and Answers on the New Electrical Code

As announced in the Jan. 15, 1924, issue, arrangements have been made with C. W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, to answer through the columns of the Journal of Electricity such questions on the new National Electrical Code as are of general interest. Mr. Mitchell presents herewith the first of these questions and answers. All who are interested are invited to send in their inquiries either to Claude W. Mitchell, Board of Fire Underwriters of the Pacific, Merchants' Exchange Building, San Francisco, Calif., or to the Editor, Journal of Electricity, 883 Mission Street, San Francisco, Calif.

Q.—Is it permissible to place receptacles in a garage if they are installed 4 ft. above the pit floor?

A.—Section 3302-b of the National Electrical Code states that, "outlet and junction boxes shall be located at least 4 ft. above the floor" of garages. Section 3303-a provides that portable cords shall have an approved pin-plug connector and the connector shall be kept at least 4 ft. above the floor. In both cases the floor referred to is not the floor of the pit but the garage floor in which the pit is located. Therefore the rule does not permit the installation of receptacles in a garage pit at any height above the pit floor.

The desirability and reasonableness of this rule becomes apparent if the nature of the occupancy is taken into consideration. More or less gasoline vapor is always present in a garage and as this vapor is heavier than air it naturally flows to the lowest level. Consequently it accumulates in the pit first and if sufficient in quantity will overflow the pit and spread out over the floor of the garage. It is obvious, therefore, that as a protection against both accident and fire all devices such as lamp and plug receptacles, attachment plugs and connectors shall be installed well above the main floor level and not in a pit at all.

Q.—In an installation where other requirements of the code have been complied with to the extent that it is permissible to omit fuses in grounded wires of two-wire branch circuits, may one such unfused grounded wire serve as a "common" for two or more branch circuits?

A.—The answer is "No." Each branch circuit shall be considered individually, without reference to the others, if there are two or more such circuits. Each of the 2-wire branch circuits shall have its own "live" (fused and ungrounded) wire and its own unfused and grounded wire. These two wires shall have no connection with similar wires of other circuits except at center of distribution at which point they become branch circuits.

Sacramento Dealers, Inspectors and Power Companies Meet

In an effort to arrive at a common understanding and interpretation of the 1923 edition of the National Electrical Code, the contractor-dealers of Sacramento, representatives of the city electrical department, the Pacific Gas and Electric Company, and the Great Western Power Company, held a joint meeting at the Contractors' Association Hall

on Thursday, Jan. 31. The meeting was attended by E. M. Hart, W. L. Hill and P. E. Loye of the Pacific Gas and Electric Company, F. H. Klipple and C. Schindler of the Great Western Power Company; C. W. Beaton and G. Cole of the city electrical department, as well as all of the members of the Electrical Contractors' and Dealers' Association of Sacramento. The discussion of the most important changes in the new Code was taken from the articles by Claude W. Mitchell which have appeared in the Journal of Electricity. Following this local problems were discussed.

Southern Alameda Electrical Men Form Development League

The electrical contractors and dealers of southern Alameda County, Calif., met recently and formed the Electrical Development League of Southern Alameda County. Jack Vieux, of Vieux Bros., Hayward, was elected president; L. E. Morgan, of San Leandro, vice-president, and Fred Mitchell, of the Pacific Gas and Electric Company, Hayward, was elected secretary.

Arthur E. Rowe, sales manager of Garnett Young & Company, San Francisco, was the speaker of the evening and gave an interesting address on co-operation. Mr. Rowe also spoke on organization and organization work.

Dinner Meeting Held by Marin County Electrical Men

The Electrical Merchants' Association of Marin County held its regular monthly dinner meeting at the Blue Rock Hotel, Larkspur, Calif., on Jan. 28. Twenty of the members were present and engaged in active discussion of betterments for retailing of electrical goods. It was decided that more attention should be paid to the matter of standardization of wiring and installation conditions and that greater effort should be put forth to increase the sale of electrical appliances and to bring about cooperation in advertising.

The meeting was addressed by George W. Barker, associate editor of the Journal of Electricity, who spoke on "Merchandising and Its Possibilities for the Contractor-Dealer." Oliver E. Sholders, sales engineer for the Pacific Gas and Electric Company, San Francisco, spoke on the "Relation of the Central Station to the Contractor-Dealer," and J. St. C. Ross, superintendent of new business for the Pacific Gas and Electric Company, San Rafael, Calif., gave a short talk on electrical development of Marin County.

The use of glassware in shading or diffusing light properly is the subject of a letter which will be sent shortly to all Denver, Colo., electrical men, architects and building interests. It is a two-page letter from M. Luckiesh, director of the Laboratory of Applied Science, National Lamp Works, Cleveland, Ohio.

M. P. Cannon of Latourette-Fical Company, Sacramento, Calif., and Mrs. Cannon were among the visitors to the annual dinner of the Electrical Contractors' and Dealers' Association of San Francisco held at Tait's-at-the-Beach on Jan. 26, 1924.

City Electricians of California Form New Organization

City electricians and their assistants to the number of about twenty met in Fresno, Calif., on Jan. 25-26, and organized the Pacific Association of Electrical Inspectors. H. W. Stitt, city electrician of Fresno, was elected president and Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, San Francisco, was elected secretary.

The various sections of the 1923 edition of the National Electrical Code were discussed in detail, especially those provisions relating to grounding and fusing. The meeting passed resolutions favoring general adherence to the Code rules.

Among those present were:

H. W. Stitt, city electrician, Fresno.
Ralph W. Wiley, chief, department of electricity, San Francisco.
R. H. Manahan, city electrician, Los Angeles.
Carl E. Hardy, superintendent, electrical department, Oakland.
B. C. Hill, supervising inspector, electrical department, Oakland.
R. W. Abright, city electrician, Long Beach.
R. B. Taplin, assistant engineer, department of public service, Long Beach.
A. E. Johnstone, city electrician, San Diego.
James M. Evans, city electrician, Modesto.
J. C. Hamilton, city electrician, San Jose.
James I. Dixon, city electrician, Santa Clara.
Frank A. Morrell, city electrician, Stockton.
G. E. Kimball, electrical engineer, Industrial Accident Commission, San Francisco.
Claude W. Mitchell, electrical engineer, Board of Fire Underwriters of the Pacific, San Francisco.

Fresno Dealer Adopts Standard for Range Installation

In order to secure uniform installation conditions on electric range and water heater sales and to have these installations of the highest standard for safety and convenience and yet at the minimum cost to the consumer, the Valley Electrical Supply Company, Fresno, Calif., has just prepared new wiring specifications covering this class of work. The specifications are embodied also in a blue print which has been drawn up and which is distributed to all workmen for their guidance.

The main service is of two No. 6 and one No. 8 wires in 1 in. Flexduct terminating in a metal meter box 16 in. x 28 in. x 9 in. This box is equipped with a padlock hoop so that it may be locked. The sub-feeds are of the same size wire and also run in Flexduct to the pull box on the back of the range. From this pull box two No. 6 wires are run in 1 in. Flexduct to the water heater. The main service switch is of 60-amp. capacity and the neutral is coppered. The Flexduct is grounded with a covered wire. The above specifications are for an installation of not more than 12 kw.

Western Hardware & Tool Company, Sacramento, Calif., has announced that it is now acting as distributor for Stephen's climbers. Ned Licht is general agent for the Pacific Coast.

Mica Insulator Company, Chicago, Ill., has recently published a four-page letter which is devoted to a description of Seamless Empire Bias tape. The letter describes the application and uses of the tape and also includes data on sizes, colors, prices and quantity discounts.

JOBBER, DEALER AND SALES AGENT



Santa Clara County Dealers Hold Unusual Display

A Cooperative Exhibit at Which No Sales Were Permitted Brought a Holiday Sales Volume Never Before Equaled

Electrical dealers everywhere are seeking new cooperative means of exploiting their business. These cooperative plans have embraced a wide scope and have proved very effective in the results accomplished. Every once in a while a new suggestion is advanced which, when tried out, proves its worth as a business getter and which justifies its continuance or repetition. The Electrical Development League of Santa Clara County has just tried out a new idea with results that are almost phenomenal in their character.

At the regular monthly dinner meeting of this league, held about two weeks before Christmas, Herbert A. Cram, representative in California, Arizona and Nevada for Landers, Frary & Clark, was the speaker of the evening, and offered several constructive suggestions for the betterment of merchandising and for increasing sales. One of these suggestions was that the dealers who were members of the league conduct a cooperative public display of electrical appliances in some building or hall convenient to the shopping center. The idea was expressed that the time was particularly opportune for such a display as only a few buying days remained before Christmas. This suggestion met with such ready approval that a committee was appointed at the meeting to confer with Mr. Cram for further ideas and to see that the plan was carried out.

This movement brought forth unexpected offers of assistance and cooperation from sources outside the electrical industry. Two different companies offered display quarters without cost to the league. Those finally selected were in the building of Harrison P. Smith, Inc., large automobile dealers of San Jose. This selection was made because of the favorable location in practically the heart of the shopping section and because of the unusual publicity which could be obtained on account of the ground floor location with exceptionally large show windows. E. J. Kingsley, San Jose manager for the Federal Electric Company, was made chairman of the committee on arrangements and was assisted by not only the other members of the committee but by the entire membership of the league as well. Each member of the league offered his services to the committee and contributed to the success of the affair, each one feeling that this was a real opportunity for true cooperation. Manufacturers of electrical appliances also offered their help and gave the services of their

salesmen and demonstrators for the entire period of the display. Jobbers also contributed their support.

Attention was drawn to the display through the columns of the daily papers and several advertisements, varying from half page to quarter page, invited all who were interested in electrical appliances or who had Christmas presents to buy to attend the exhibit. These advertisements contained the statement that the display was free and that no sales effort would be permitted. Advertisements were run daily during the exhibit and, in addition, the affair was considered of news value by the papers and was so treated in their columns. The amount of news publicity thus obtained was of considerable volume and aided greatly in drawing attention of the public to the display.

The first principle established by the committee was that there should be absolutely no selling on the premises during the display although any appliance might be connected and working for demonstration purposes. This move was made as it was felt that if sales were to be made many people would stay away for fear of being importuned to buy and that thereby a large part of the publicity value of the display would be lost. Their foresight in this respect was well confirmed by the fact that the attendance, during the five days of the exhibition, was somewhat over 3,000 people, or an average of approximately 600 per day, each visitor feeling free to inquire about any device that appealed, knowing that such inquiry would not lead to an effort to make a sale.

As each visitor entered the show room he was given a card bearing the names of all San Jose members of the league and containing a statement that the devices on display were not for sale at the showroom but could be purchased from any one of the dealers whose names were on the card. This card served not only as an invitation to inspect all devices on display but also acted as a lasting advertisement for all members of the league.

Large tables, attractively decorated with crepe paper in the Christmas designs and colors, were used to hold the smaller appliances and lamp socket devices. This style of display permitted a pleasing arrangement of these devices and gave them a seasonal background. The heavier devices, such as ranges, water heaters, washing machines and vacuum cleaners were placed on the

floor around the walls and many of these appliances were connected up for actual demonstration and use. Trained factory demonstrators cooked on the ranges and distributed samples of the prepared foods. Electric air heaters were displayed in a special section of the room in order to permit of adequate showing and explanation, and, insofar as possible, this plan of segregating the various kinds of appliances was followed out throughout the entire exhibit. All appliances were displayed without cards or other forms of advertising and no trade names were permitted to be displayed on the devices.

To add to the Christmas atmosphere and to stimulate the gift thought in connection with electrical appliances, a large Christmas tree was placed in the center of the room and this tree was illuminated with electric tree lights and was beautifully decorated. No appliances or other merchandise were permitted on the tree, the intention being to compel attention to the displays on the tables and floor. Special illumination, installed under the direction of M. H. Anderson, illumination engineer of the Pacific Gas and Electric Company, San Jose, added to the attractiveness of the display and helped to show off the appliances to better advantage. This illumination also made possible the selling of the idea of better lighting for homes, stores and offices and resulted in considerable interest in lighting fixtures and practice.

No effort was spared to make the entire display, while primarily for the exhibition of appliances, effective for the entire electrical industry and full information was given relative to adequate wiring, heating, illumination, cooking, water heating, etc. Owing to the fact that no sales were permitted at the exhibit the work done was of unusual effect for visitors asked questions freely. Many dealers are still making sales as a result of the display.

Eight dealers contributed to this display, which is said to be the first of its kind in the country. All of the dealers who participated were highly pleased with the results and expressed a desire to repeat the display for future holiday seasons. Some of the results obtained in sales volume were of unexpected proportions. One dealer, for example, reported a sales volume of electrical appliances alone of \$600 per day during the display as compared with only \$200 per day for the corresponding period of last year. Another dealer reported the sale to one prospect of over \$1,000 in appliances and wiring as a direct result of the display. Others reported extremely satisfactory results and were well pleased at the outcome of the effort.



These photographs show the arrangement of appliances used in the holiday display of the Electrical Development League of Santa Clara County. The quarters were donated by a leading automobile dealer and all members of the League gave their services. No sales were permitted at the display but demonstrators were at hand to show the operation of equipment. The attendance at the exhibit averaged about 600 persons per day and totaled over 3,000 for the five days.



Displaying the Moderate Priced Electric Home

Electrical Cooperative League of Denver Sponsors Five-Room Bungalow Showing What Can Be Done Economically

That the electric home does not have to be an expensive home has long been realized by the electrical industry, but to the public—the actual builders of houses—the fact has not been so patent. Most of the electric homes that have been opened for inspection have been of the more elaborate type and this has, to some extent, been responsible for the feeling among the public.

To combat this idea, the Electrical Cooperative League of Denver, Colo., decided to sponsor and exhibit an electric home that should be of the type that would be within the reach of the home builder of moderate means. It was decided that a five-room bungalow should be used for telling the story and arrangements were made to present the moderate priced electric home to the public.

Contrary to the system employed in the case of the League's first home, opened a year and a half ago, the expense of the construction of the home was borne by a Denver building and investment company. The home was built for a private family and was not offered for sale at the time of the exhibition.

Furnishings and decorations were provided by a Denver concern as was the case also of the electrically operated musical equipment. Approximately 45 electrical appliances and lamps were provided by jobber and distributor members of the Denver league, as a result of an appliance drawing. These devices were placed about the five rooms of the home, some of them going in the finished basement where the laundry and den were situated.

The electric home was advertised as a modest bungalow in order to combat the theories of some that wealthy classes only could afford electrical conveniences and complete wiring.

To advertise the opening of the medium priced home, double-page spreads appeared in the larger of the local newspapers in advance of the formal opening in addition to a special 12-page supplement in one of the smaller papers. In addition small advertisements were carried in the various newspapers during the exhibition. More than two and one-half times the advertising space used was obtained as free reading matter. This reading matter dealt specifically with the location of the home, the Electrical Cooperative League as the exhibitor and the features of the electric home. Advertising was supervised by the advertising and publicity committee with A. C. Cornell as chairman. The general arrangement of the home was in charge of a special committee headed by D. D. Sturgeon.

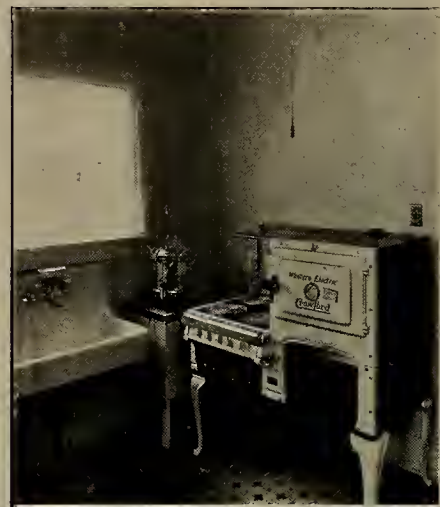
The exhibit was advertised as "a modest bungalow that people of average means can afford!" "modest costs, modern comforts!" "a bungalow full of convenience" and "an education to see just what ease and beauty adequate electric wiring and equipment can put into a modest home." Copies of "My Own Electric Home" obtained from The Society for Electrical Development, Inc., were distributed to all visitors at the home.

Volunteers from the industry served as attendants and lecturers. In every room they especially emphasized the modest cost of the wiring installations which consisted of 78 outlets, as follows: 21 convenience, duplex type; 25 switch outlets and 32 lighting (10 bracket and 22 ceiling). Included were six sets of 3-way switches.

During the ten days that the home was open for inspection 8,982 persons passed through it and were shown what electricity could do in the moderate priced home. Figures compiled after

the closing of the home showed that it cost the league 12 cents per person to place the exhibit before the Denver public.

Considerable comment upon the electric labor-savers installed in the home was made by the visitors, all of whom displayed marked interest in the electrical features. According to O. L. Mackell, chairman of the Electrical Co-



The kitchen was of principal interest to the women visitors.

operative League, a large number of visitors at the electric home proved themselves familiar with the wiring features. Many said they had inspected the first home and expressed a preference for the second over the first.

An interesting comparison between the first and second home was afforded in connection with the peak-load attendance, according to S. W. Bishop, executive manager of the Denver league. In the first home, twice as many people passed through at night as in the afternoon. The condition was reversed, however, in the last home and the season of the year was explained as causing the difference. In the first case, visitors waited at night in the balmy spring weather to be admitted to the home. In the second home, however, the waiting was done in the afternoon instead of in the chilly evenings. Under those conditions, a larger percentage of women was checked in the total number of visitors.

Women manifested the greatest interest in the kitchen and laundry which were described by the attendants as being the most important rooms in the home, electrically speaking. Men, on the other hand, interested themselves largely in the den, living rooms and sleeping rooms.

The home was located at 1635 East Seventh Avenue, one of the principal residential thoroughfares, and was within easy reach of all parts of Denver. Two street car lines served to accommodate all visitors. From a spectacular standpoint, the exterior of the home was dressed in a blaze of light at night by means of flood lights. Supplementing these were strings of colored lights extending in both directions from the home on Seventh Avenue.

Except for the last day of the exhibition, which was marked by a snow flurry, ideal weather conditions prevailed throughout.



Interior of the living room of the second official electric home in Denver, Colo.

Preparing Meals Electrically for Salt Lake City

Fifty-Nine Electric Ovens Employed by Utah City Commercial Establishments in Supplying Cooked Foods

The development of the use of electric bake ovens in Salt Lake City, Utah, has progressed to such a remarkable extent that at the present time that city claims the distinction of having more of such ovens per capita than any other city in the world. It is exceeded in actual number by one other city (Chicago) where the population is thirty times that of Salt Lake City.

The first installation for commercial electric baking in Salt Lake City was made in 1914. This was an 80-loaf Hughes type oven, with a connected load of 16 kw., installed at Shay's Cafeteria. The oven is still in operation. The operation of this oven proved a complete success, and since that time electric baking has proved so satisfactory that many classes of business are included in the Utah Power & Light Company's electric baking customers. In fact, the electric bake oven is used in practically all places where extensive baking operations are carried on. Bakeries, restaurants, cafes, grocery and delicatessen stores, meat packing plants, schools, clubs and public institutions are listed among the users.

At the present time the Utah Power & Light Company has a total of 79 bake ovens connected to its lines, ranging from 30-loaf to 60-loaf capacity. Fifty-nine of these ovens are in Salt Lake City. The largest oven will bake 24,000 1-lb. loaves in 24 hr. The Utah Power & Light Company, in addition to being one of the first central stations in the country to start campaigning on electric ranges, also pioneered the commercial cooking and baking idea, with the very satisfactory results stated.

The operating results of electric bake ovens, throughout the company's territory, have been highly satisfactory, and

all users of the ovens are enthusiastic in their praises of this method, due to its efficiency, cleanliness and economy. More than a million kilowatt-hours are used annually for baking on the Utah Power & Light Company's system.

There is electrically baked daily in Salt Lake City by commercial establishments, the following:

6,468 loaves of bread
3,293 dozen rolls
1,207 cakes
3,019 pies
325 lb. roast meat.

This would feed 10,000 men daily on the following basis for each man:

$\frac{3}{4}$ lb. of bread
4 rolls
1 piece cake
 $1\frac{1}{2}$ pieces of pie
1 serving roast meat.

Users of electric ovens find it to their advantage to "play up" the fact that their products are electrically baked, suggesting as it does the appeal of scientific and up-to-date methods. Progressive bakers readily adapt their methods to the use of continuous baking, by scaling and moulding enough dough to load the oven, and while that is baking, working the balance into loaves. Invariably, greatly increased business has resulted to users from the installation of bake ovens.

HANDBALL IN BUSINESS PLAYING TO WIN

By JOE OSIER

Following defeat in a handball court recently, a fast-stepping, fighting, hard-losing friend of mine offered this alibi: "You didn't beat me. You can't beat me. I beat myself.

"I didn't serve the right kind of balls to you; I didn't pay attention to my returns; I didn't play the corners right; I was over-anxious and dubbed several shots that should have been dead easy outs.

"In fact, I gave the game to you. It was just a present. I beat myself."

After saying which, my friend strode under the shower, leaving me with the thought that—

Many electrical contractor-dealers and executive heads in the industry—going concerns—(the Lord only knows how)—are—



Maybe he socks himself on the head because it feels good when he stops.

Daily defeating themselves because they are not utilizing handball tactics in the conduct of their affairs.

They are not developing a serve that will win and are losing cash customers daily as a result. They are dubbing their shots; booting easy chances; using poor judgment and—

Consequently, their patrons are playing elsewhere and fattening the averages of competitors.

The nation over, heads of these concerns, responsible for heavy payrolls, are losing games when they should be winning. Their service is bad and they are leaving loopholes in their defense that another firm's organization can crawl through.

Many of them are facing the bankruptcy court and no few are paging the sheriff and his husky deputies because—

They are not on their toes, alert and ready for the sizzling sphere as it comes zipping back from the service wall.

These men, I contend, are over-trained or under-trained; they are too confident or lack confidence; they are short-sighted or too visionary and—

Sooner or later, their creditors will lug them out of the court and—

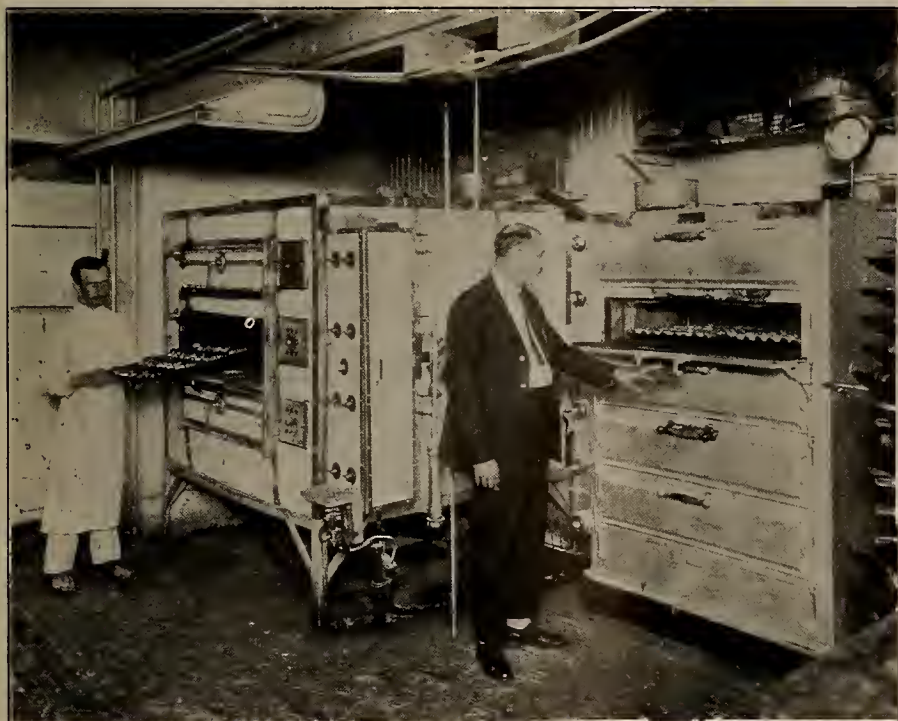
Try and collect cents on the dollar.

Some men, I find, make millions while others are making messes but, invariably—

The men who corral the clams—

Are the boys who have their heads up and their eyes open. They play to win and—

The tallies totaled tell the tale.



The two electric ovens used by the Royal Bakery in the preparation of cakes and pastry make a connected load of 41 kw.

INDUSTRIAL NEWS



Cooperative Campaign Plans for 1924 Are Announced

A budget of \$50,000 has been provided to carry on the 1924 program of the California Electrical Cooperative Campaign. Of this sum \$20,000 is to be raised by the manufacturers, jobbers and contractors and \$30,000 will be supplied by the power companies and dealers. Plans for the Campaign's activities during the present year have recently been announced by the advisory committee of the organization.

The plans for Campaign activities during 1924 call largely for the continuation of these efforts which have proved most effective in the past, in order that they may be carried on to a point of conclusion and that the greatest good may be realized from them. Some new ramifications may be adopted but these will simply be a means to the end and in the main the work will be:

A continuation of the adequate wiring program, including the calls upon architects, builders, realtors and owners; the preparation and distribution of wiring plans and specifications, and work with the architectural and electrical classes of the schools; also with the electrical contractor-retailers.

As in the past, electric homes will be opened for public inspection wherever there is an assurance of the wholehearted support of the local electrical interests and of an interested attendance; and wherever there is prospect of enough home building to give promise of the effort being capitalized upon in the near future. These homes will, in every case, make prominent display of electrical cooking, water heating and air heating.

The practice of addressing the women's clubs upon the subject of "Homes"—contrasting the inescapable drudgery in the homes of the past with the possibility of eliminating that drudgery in the modern home—will go on.

The interest created by the window lighting display warrants the continuation of its tour about the state, and the experience gained through its showing during 1923 will undoubtedly lead to even more effective meetings this year.

Likewise the committee has pledged itself to encourage, foster and take an active part toward making a success of the lighting schools and the lighting month which the lighting bureau of the Pacific Coast Electrical Association is undertaking for the good of the industry.

The committee has gone on record as pledging itself to promote the June Bride Week sales campaign and such other drives as may be considered timely and advisable.

So frequent have been the requests received by the California Electrical Cooperative Campaign from Chambers of Commerce, Californians, Inc., and similar organizations in California and elsewhere for information as to the number of persons engaged in the different branches of the electrical industry in that state that the Campaign has determined to undertake a census, the foundation of a permanent running record of the number of persons, men and women, engaged in the various branches of the electrical industry, divided so as to show those permanently employed and those transiently engaged in construction work.

Plans are now under way to devise a means whereby the Campaign can assist the efforts being made toward a greater recognition of the advantages which electricity has to offer in industrial transportation.

Seven persons are now employed by the Advisory Committee of the Campaign to carry on the work that will be involved in connection with these outlined activities. The personnel of the organization for 1924 is announced as follows: Victor W. Hartley, executive secretary; Gladys M. Bromley, stenographer and bookkeeper; Lois Hoadley, stenographer, Los Angeles office; Helen Grahame, representative, southern section; Frank J. Kiefer, field representative, northern section; George N. Rankin, field representative, valley section; and Frank N. Smith, field representative, southern section.

Fifty dollars in cash prizes are being offered by the Electrical Service League of British Columbia, Vancouver, B. C., for an emblem for use on stationery, advertising or signs. Any person who resides in British Columbia and who is not a member of the league council or an employee of the league may compete. Designs must be in the hands of the secretary-manager by April 5. The designs are to be judged according to their significance to the public as emblematic of the league's purpose, namely, to develop the electrical industry in British Columbia, and must show the name of the league legibly. Reduction to one-half inch in width must be possible.

The British Columbia Electric Railway Company, Vancouver, B. C., is building a \$40,000 addition to its new Westminster Substation. It will house an additional 500-kw. rotary converter for the railway service, this rotary being removed from the Burnaby substation where a 1,000-kw. synchronous condenser is being installed to correct the power factor of the system. Work on the building is being done by a local firm.

Railroad Commission to Evaluate Power Properties

The Board of Supervisors of San Francisco, Calif., has applied to the California State Railroad Commission to fix the valuation of those portions of the electric generating, transmission and distribution properties of the Pacific Gas and Electric Company and the Great Western Power Company, both of San Francisco, that the municipality contemplates taking over and using for the distribution of power from its Hetch Hetchy project.

The finance committee of the board has adopted resolutions authorizing the sale on March 24, 1924, of \$5,281,000 worth of Hetch Hetchy water bonds, 1910 issue, to provide the funds necessary for carrying on the project during the year. At the request of the supervisors, M. M. O'Shaughnessy, city engineer, prepared the following estimate of the financial needs for 1924:

Needed for mountain division: Early Intake	\$ 285,000
Aqueduct tunnel, south fork crossing	863,000
Priest division: Moccasin power tunnels, control gates, concrete lining, surge shaft	450,000
Moccasin creek penstocks	550,000
Moccasin power plant, building, etc.	555,000
Transmission line, Moccasin Creek to San Francisco	1,545,000
Bay crossing pipe	820,000
Engineering and incidentals, 10 per cent	503,800
Total	\$5,574,800

The board's action was taken following the receipt of the engineer's report.

The Dominion Government has commenced the erection of a wireless plant in connection with the Royal Canadian Air Force, at Jerico Beach, Vancouver, B. C. The towers will be of fabricated steel, 100 ft. high and 300 ft. apart, and will be erected by the Royal Canadian Engineers. The plant will be equipped with wireless and radio sending and receiving apparatus, and will be sufficiently powerful to communicate with the plant at High River, Alberta, 500 mi. to the east, whence messages can be relayed to eastern Canada. The airplanes and seaplanes at Jerico Beach will be equipped with radio receiving sets, which will enable the airmen to keep in touch with their base during flight.

The Port of Portland (Ore.) has now plans and specifications for the hull of the proposed dredge to be known as the Clackamas. Bids will be received on March 15. The hull is to be of steel, 236 ft. long; 50 ft. beam and 12 ft. 9 in. depth. The port engineer is to go East to make a study of the type of electrical machinery which will be used in the dredge.

P.C.E.A. Commercial Section Meets at Del Monte

Reports by Various Sub-Committees Indicate Progress During Year

Papers Considered for Annual Meeting

The commercial section of the Pacific Coast Electrical Association held its quarterly meeting at the Hotel Del Monte, Jan. 25-26. A. E. Holloway, chairman of the section, presided over the executive committee meeting and the various sub-chairmen were present to participate in the discussions and reports of their separate committees. Since the previous meeting, held at Fresno on Oct. 19-20, 1923, the members of the special committees have been active in their respective fields and the reports presented at Del Monte indicated considerable progress.

The committee on appliance sales, under H. C. Goldrick, of the Western Electric Company, Los Angeles, Calif., passed resolutions that one of the national electrical cooperative organizations should proceed with the preparation of material to sell the electrical appliance idea to the industry itself, particularly to those employees who come into contact with the public. This step was taken as it appeared from discussion that many sales of electric ranges, water heaters, etc., are killed by the unthinking expressions of those employees who are not familiar with operating costs.

The resolution which will be presented to the national organization for their consideration was drawn up by a committee on resolutions and is as follows:

Whereas, It has developed in discussion that education on electric sales and application is still very much needed among the ranks of the industry, especially among those who meet the public in any capacity whatsoever, namely: salesmen, wiremen, metermen, troublemen, servicemen, deliverymen, minor executives, etc., and

Whereas, There is a manifest lack of consideration on the part of these people as to the service which these devices will render, together with a lack of knowledge of the device itself and its application, be it therefore

Resolved, That a means should be provided by one of the national cooperative organizations—either the N.E.L.A. or the S.E.D.—which means should be presented to all members of

the industry to the effect that the comfort and usefulness which electrical appliances render in daily life and the savings thereby effected, and be it further

Resolved, That this means be made available through all the various electrical organizations to all members of the electrical industry, these organizations being the A.F. of L., I.B.E.W., and all other organized bodies interested in the electrical development of the United States.

The committee expressed its confidence in the contractor-dealer and his efforts in the following manner: "This committee desires to be placed on record as appreciating highly the work done by the contractor-dealer in promoting and developing the electrical industry and further desires to here express its confidence in the contractor-dealer and to pledge its support to his legitimate efforts."

In the street lighting committee an excellent paper was presented by H. H. Allison, illuminating sales engineer of the Pacific Gas and Electric Company, San Francisco, Calif. This paper contained a clear analysis of the street lighting situation, of its importance and of its development possibilities.

The executive committee voted to hold its next meeting in San Francisco, Calif., on March 21, 1924. Reports from the various sub-committee chairmen indicated that considerable progress had been made and that papers of unusual merit would be presented at the annual meeting. An appropriation of \$500 was approved for the purpose of purchasing equipment and carrying on a lighting school under the direction of the lighting bureau. It is planned to secure fifty men in each of three districts—northern, central and southern California—to take a course of instruction in lighting fundamentals. It is expected that this course will be started not later than August of this year and that the portable lighting exhibit which will be used for the course will be productive of results in improved lighting, which will more than justify the effort and

expense. The executive committee also voted the appropriation of \$50 for the purpose of reprinting data in connection with Diesel engine operation. These reprints will be furnished to central station men who are interested and to others who are concerned in the relation of Diesel engines to electric generation.

The lighting bureau committee passed a resolution of protest against the provision in the new National Electrical Code which permits 15 amperes per circuit in place of the old "660-watt rule." The committee also favored the raising of funds to promote higher lighting intensities in the home and to further the idea of color lighting for homes.

Samuel H. Taylor, secretary of the Pacific Coast Electrical Association, outlined the financial plans of the association and gave some interesting facts and figures relative to the progress of association work.

F. J. Airey, chairman of the lighting bureau committee, announced the appointment of the following new members of the sign lighting committee:

- C. O. Martin, Benjamin Electric & Manufacturing Company, San Francisco.
- H. L. Johnson, Southern California Edison Company, Los Angeles.
- C. B. Merrick, San Joaquin Light & Power Corporation, Fresno.
- A. E. Sargison, Edison Lamp Works, San Francisco.
- Clark Baker, National Lamp Division of General Electric Company, Oakland.

A. E. Holloway, chairman of the commercial committee, announced the appointment of H. C. Goldrick of the Western Electric Company, Los Angeles, W. C. Heston, Pacific Coast editor, Electrical World, San Francisco, and George W. Barker, associate editor, Journal of Electricity, San Francisco, as a committee on publicity.

Pasco to Pendleton Power Line Is Nearing Completion

The Pacific Power & Light Company is spending \$300,000 to bring a new 66,000-volt power line from Pasco, Wash., to Pendleton, Ore., and in making improvements coincident with the new line. With the completion of the work, which Dr. F. W. Vincent, local manager, states will be finished about March 1, the present 25,000-volt line from Walla Walla River will no longer be used except in case of an emergency.

The new substation is being built adjacent to the power plant at Thompson and Railroad Streets and the transformer to step the voltage of the Pasco line from 66,000 to 2,300 v. will be installed there. The substation will be strictly modern and the apparatus will be out of doors. The present station used for the Walla Walla River line will be kept in first-class repair and the transformers and switches used for the line will be placed in the new station. In bringing the line from Pasco it was found necessary to build two towers 150 ft. in height, where the line crosses the Columbia River. In spanning the river the wires are each 1,800 ft. long.

A permit has been granted by the Federal Power Commission to the Southern Idaho Land & Power Company for a power project on Crane Creek, Washington County, Idaho, where a dam and power house will be constructed to develop 25,000 hp.



Members of the various sub-committees of the commercial section of the Pacific Coast Electrical Association in convention at the Hotel Del Monte, Del Monte, Calif., Jan. 25-26.

Better Lighting Being Sponsored by Vancouver League

Promotion of better lighting in every sphere is about to be made one of the major activities of the Electrical Service League of British Columbia. Particular emphasis is to be laid at first on the necessity of better lighting in school rooms.

A recent survey of class rooms in Vancouver by members of the league showed some small children staring into naked lights of 100 to 150 watts, thus imperilling their eyesight. The gravity of the situation was immediately drawn to the school authorities, including the chairman of the board of trustees, the municipal school inspector and the school building engineer, and all agreed that the lighting must be improved.

Owing to a certain situation in Vancouver whereby new capital expenditures were voted down by the property owners until a new basis of taxation could be evolved, there is no money available for improvements. A better situation obtains in the municipality of Point Grey, a suburb of Vancouver with 110 class rooms in its schools. The officials of the school board there also are sympathetic but the league is about to work through the various parent-teachers' associations, the ward improvement associations, and other bodies so as to work up public sentiment in favor of better lighting in class rooms. When this is done, the time will be ripe, it is expected, for approaching the school board to make the necessary expenditure.

The league is fostering improved street lighting in Vancouver, by proposing to banks and such institutions whose buildings are often dark at night, the use of more light outside their premises. James Hart, secretary-manager of the league, assisted by the large company members, is approaching the principal banks to this end and they are being supported by the civic publicity bureau. It is considered that better lighting of streets is of vital importance in attracting tourists.

At the same time as this movement, C. H. Fletcher, city electrician of Vancouver, is preparing plans for replacing the cluster lights with single units of higher efficiency and candlepower. Merchants on the principal streets are taking an active part in the plans for better illumination.

Mr. Hart, of the Electrical Service League, assisted by W. J. Tulk, illumination engineer for the British Columbia Electric Railway Company, is making calls upon industrial firms in the interests of better factory lighting and many new installations are being made.

Tacoma Municipal Net Operating Income Less Than 1922

The total net operating income of the Tacoma, Wash., Municipal Light Department for 1923 fell below that of 1922. The department's gross business during 1923 was heavier than ever before in its history, the annual report shows. Despite no especial effort to increase the load, and that the winter's mild temperature cut down heating demand, the gain was 6.4 per cent.

The net operating income for 1923 was \$740,835.04 as against \$810,361.94 for 1922. The gross income was \$1,375,-

737.75 for 1923 as against \$1,292,423.53 for 1922. Operating expenses for 1923 were \$571,632.68, including depreciation charges, leaving \$804,105.07 as operating income. To this sum, \$45,732.23 of miscellaneous revenues was added and interest and gross earnings tax deductions of \$109,002.26 were made, leaving the net operating income given.

Group Insurance Provided for Power Company Employees

The Umpqua division of The California Oregon Power Company has received for each member a life insurance policy issued by an eastern insurance company. This form of insurance is presented to the permanent, full time employees of the company under a group policy which covers the lives of all the permanent employees of the organization who have been with the company for six months or more. It is furnished at no expense to the employees and does not in any way displace any payments provided for by the workman's compensation act.

As the properties of the Douglas County Light & Water Company were taken over by The California Oregon Power Company in July, 1923, the employees of the old Douglas County company have therefore been in the employ of the new company for a period of six months and automatically come under the company's group life insurance policy.

An attractive 38-page consumer booklet has recently been published by the merchandise department of the General Electric Company. The booklet, known as Y-1834, is entitled "The Home of a Hundred Comforts." By means of editorial matter and illustrations the prospective home owner, on reading the booklet, is taken from the front door through the entire house to the basement and en route is acquainted with all of the comfort-making and labor-saving functions that electricity performs in the modern home. In addition to this material there are isometric drawings of a house and three alternative wiring diagrams for proper electrification of the structure. Several pages of the booklet are devoted to a description of the convenience of modern wiring devices and appliances.

The Willapa Electric Company, operating the street car line between South Bend and Raymond, Wash., and supplying power and light exclusively to Raymond, and in competition with the Willapa Power Company in South Bend, has petitioned the Pacific County Commissioners to use the Smith Creek-Brooklyn road as right-of-way for a proposed transmission line, and to grant a 50-year franchise. The company, in its petition, states that it is now generating power from a steam plant in Raymond, but wishes to bring power over the proposed line from a new plant of the Grays Harbor Railway & Light Company.

Gray's Harbor Railway & Light Company has applied to Grays Harbor County Commissioners for permission to run a light transmission and distribution line south from Vesta to the county line—the line to follow the route of the North River road.

Central Station Employees Told of Company Activities

In October, 1923, The Washington Water Power Company, Spokane, Wash., established its new department of public relations, under W. H. Ude as director. Among the principal duties of the department are the fostering of close relations with the public in matters that affect both their own welfare and that of the company, and the sale of company securities among their customers. Realizing the cooperation that could be given in these important matters by the whole organization of the company, which numbers nearly six hundred employees, Mr. Ude planned a series of discussions on various phases of the company's business. This began about Oct. 15 and lasted until the end of the year. These discussions took the form of 30 or 45-minute talks given by various employees, with several minutes at the close devoted to questions and answers. The employees were divided into five sections, and each talk was given every day except Saturday for a week, from four to five o'clock. Thus all the employees were able to attend the course, on company time. Below are given the names of the speakers and outlines of the subjects:

D. L. Huntington, president. General introduction and explanation of the purpose of the series of discussions. The conditions which have necessitated corporations, and the principles underlying their formation, organization and financing, with particular reference to The Washington Water Power Company.

Miles W. Birkett, vice-president and general manager. The water power resources of Washington, and a review of the history of the physical growth of the company since its formation thirty-four years ago, illustrated with statistics on capacity, output, revenue, population and number of customers served.

V. G. Shinkle, secretary-treasurer. General explanation of financial matters, company securities, and the relation of power costs to total production costs.

V. H. Greisser, chief engineer. Explanation of relation between cost of furnishing service and rates, with reference to necessary difference in rates for large and small consumers, based on transmission, distribution, and service facilities, power losses between head water and consumer, effect of price advances on various elements of plant investment.

Lewis A. Lewis, sales manager. Explanation of the theory of rate making, justifying demand charge and minimum bill, the effect of increased use of energy and acquisition of large power loads upon rates for smaller consumers, comparison of company rates with those in other industrial centers.

W. H. Ude, director of public relations. Regulation of utilities by state commissions and the establishing of the rate base, the protection of the public interests, and of the utility's investors, through the agency of the commission.

Thomas Aston, claim agent. Taxation, the effect upon gross revenue, the menace of socialization of all property, the need of an adequate return to citizens for taxes paid, explanation of the various taxes paid by the company.

L. E. Morse, assistant treasurer. The need for customer-ownership of utilities, and the growth during recent years, what cooperation of company employees means in this important work, the security underlying company stocks and bonds.

J. B. Fiske, consulting engineer. Some early and unwritten history of electrical development in Spokane, beginning about 1885, and covering the growth of lighting, the introduction and development of motor loads.

J. S. Simpson, auditor. The annual report for 1922 for The Washington Water Power Company. This was explained item by item, with full details as to the need for the system of accounting.

W. T. Ryan, industrial engineer. The part played by The Washington Water Power Company in the industrial development of Spokane and the neighboring territory, the coming importance of Spokane as an industrial center, explanation of contributing factors, the record of the company, and a comparison of the central station with other corporations.



White River Power House of the Puget Sound Power & Light Company where additional generating equipment is being installed.

Development Program Is Announced by Utility

Installation of New Plant and Enlargement of Present Facilities Planned by Puget Sound Company

The Puget Sound Power & Light Company has announced that it will immediately begin the construction of a 45,000-hp. hydroelectric plant on the Baker River in Skagit County, Wash. This plant, which will represent an investment of \$6,000,000, will be erected at Eden Canyon. This is but a short distance from the confluence of the Baker and Skagit Rivers, just outside the town of Concrete. Here a narrow natural chasm of solid rock provides a good location for the installation of a concrete dam that is to be 235 ft. in depth from the solid rock at the bottom of the canyon to the upper edge. Foundations and approximately a depth of 50 ft. of the dam are scheduled for completion this year, and the entire work is expected to be completed in

1925. A view of the dam site appears on page 120 of this issue of the Journal of Electricity.

The company expects to be generating 30,000 hp. of electrical energy at the Baker River plant by the end of 1924 and later to install an additional turbine to bring the full capacity up to 45,000 hp. The company's White River plant, located between Seattle and Tacoma, has a capacity of 61,662 hp., and another unit is soon to be added at an approximate cost of \$1,000,000. Snoqualmie Falls and Electron produce approximately 27,000 hp. each. The new installations, together with its other hydroelectric and steam plants, will provide the Puget Sound Power & Light Company with approximately 225,000 hp. of electrical energy.

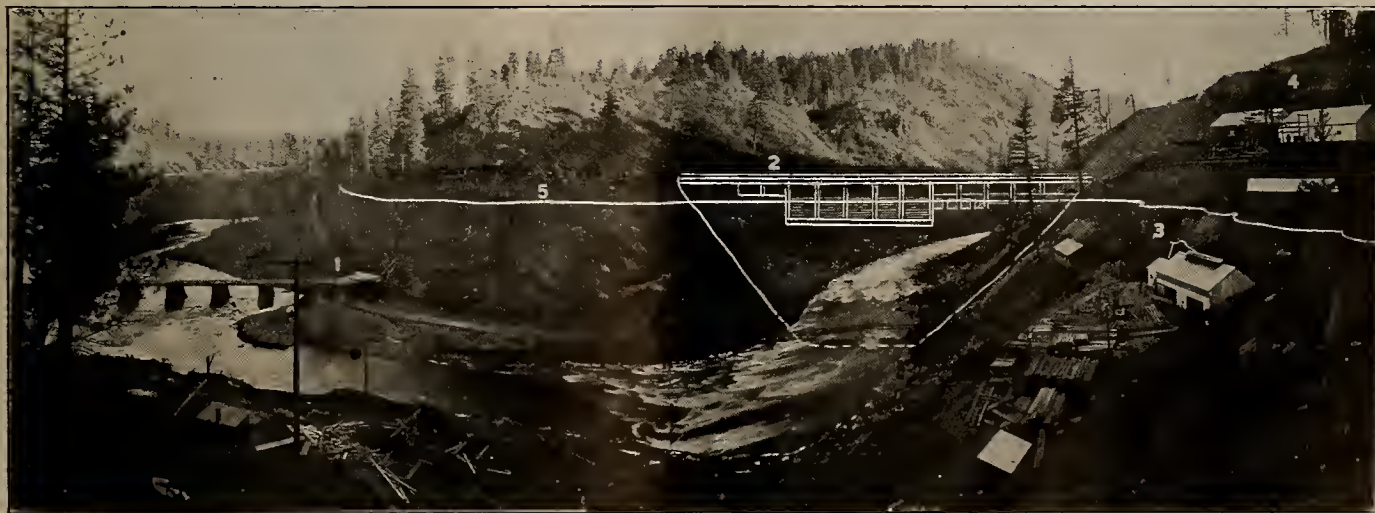
Increase Substation Equipment in San Francisco

Owing to the increased demands for electrical energy in that section of San Francisco, Calif., in and about 3rd and Market Streets, the Pacific Gas and Electric Company has found it necessary to expend approximately \$196,400 for additional equipment in its substation located on Jessie Street between 3rd and 4th.

This new equipment will consist of three direct current generators, each having a capacity of 2,500 hp. They will be of the most modern type of construction and especially equipped to automatically take care of any interruption in service that might occur. They are so constructed that they will take care of 100 per cent increase in demands for a period of ten minutes.

In speaking of this addition to the local plant, H. Bostwick, division manager of the company, states that figures just compiled for the year 1923 show that the gain in consumers over the company's system has been the largest in the history of the company, even exceeding those years in which large blocks of consumers were acquired through the purchase of other companies. The gain in consumers for the last twelve months was 58,265. Of this amount 29,981 were electric, 27,422 gas, 825 water, and 37 steam.

A 4,500-kw. transformer is to be added to the plant equipment of the Oregon Pulp & Paper Company at Salem, Ore. The new unit will take the place of the 1,500-kw. transformer now in use by the company. The transformer and the building to house it will cost approximately \$20,000. Automatic oil switches and other up-to-date equipment will be included. The building of the larger substation will make it necessary for the Portland Railway, Light & Power Company to extend its 57,000-volt line from the substation on Liberty and Mill Streets to the paper mill's substation.



View of dam site on the Pit River, five miles above Pit No. 3 Power House of the Pacific Gas and Electric Company. (1) Beginning of a temporary diversion dam which will divert the water of the Pit River from its main course through a temporary flume along the mountain side to permit anchorage of footings for the dam in the bed of the river. (2) Site of 110-ft. dam, top of which will be used as a part of the new county road from Cayton Valley to Burney Falls. This dam will back up the water for a distance of ten miles. (3) Inlet of concrete lined tunnel, 19 ft. in diameter and approximately 21,000 ft. long, through which the impounded water will flow to the Pit No. 3 Power House. At the end of the tunnel the water will drop 155 ft. into the power house, where generator equipment for 100,000 hp. in electrical energy will be installed. (4) Road bed of the Pacific Gas and Electric Company's railroad, running from Bartle to the Pit No. 3 Power House, a distance of 33 miles, built to carry in food and supplies to the crew of 1,000 men now working on this project. (5) Water level when dam is completed.



One hundred and sixty-five members of the El Paso Rotary Club were the guests of the El Paso Electric Railway Company at two luncheons held in the company's club rooms recently. An inspection of the plant was made after each luncheon.

El Paso Rotarians See What Is Behind the Button

Members of Club Guests of Company at Luncheon and Are Taken on Inspection Tour of Central Station Plant

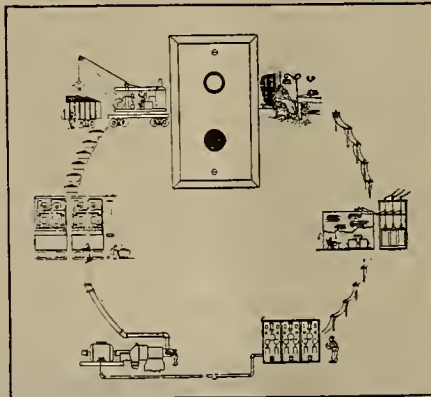
Members of the Rotary Club of El Paso, Texas, were the guests of the light and power department of the El Paso Electric Railway Company at two luncheons conducted in that city recently. The purpose of the luncheons was to acquaint the business men of El Paso with the company's distributing and generating equipment. One hundred and sixty-five members of the club were entertained at the two luncheons and were later given an opportunity to visit the company's plant.

The luncheons were held in the utility company's club room, the guests being seated at a rectangular table. In the center of the space formed by the table a model of the company's generating plant was erected. This reproduction was complete even down to the coal piles that adjoined the plant. The plant was lighted and a buzzer was placed inside of the miniature building to simulate the noise made when the equipment was in operation. A miniature electric street railway system was placed on top of the luncheon table and a train, named the "Rotary Special," traveled over the tracks, stopping in front of each guest and permitting him to take from it cigars and cigarettes with which the train was loaded. Behind the "railroad right-of-way" were miniature street lamps. Current was supplied to the gold colored globes during the luncheons.

J. F. McLaughlin, superintendent of the light and power department of the El Paso Electric Railway Company, acted as toastmaster at both luncheons and a short talk welcoming the guests to the plant of the company was presented by Alba H. Warren, manager of the company. The mayor of El Paso and several aldermen were also in attendance at the luncheons.

As a guide to the visitors, a small booklet was presented to each Rotarian. This booklet explained the functions of each department and of the various pieces of equipment that they saw on making the inspection tour of the plant. Each piece of machinery and every de-

partment was given a number that was placed in plain sight, the corresponding number appearing in the booklet, where a short description was presented. Members of the light and power department also acted as guides. The material in the souvenir booklet was written in the language of the layman and this to-



The booklet that was presented to each guest was titled, "Rotary Sees What Is Behind the Button."

gether with the remarks that were made by the guests enabled the visitors to gain a comprehensive idea of the work done by the central station in supplying electric current to the city of El Paso.

A conference was held at Victoria, B. C., recently, between representatives of the British Columbia Electric Railway Company and subsidiary power companies, representatives of logging companies that use Alouette Lake for logging purposes, and E. Walmsley, crown timber agent, at which an agreement was reached whereby the power companies will be allowed to raise the level of the lake 40 ft. if they provide a spillway and log-chute at that level. The power companies purpose to utilize the water of Pitt River three times on its way from its source, at Alouette Lake, to the Fraser River.

Public Ownership Bills Endorsed at Washington Meeting

At the second state-wide power conference held in Seattle, Wash., on Jan. 26, called by the committee of twenty-five named at the first state conference to consider the various power measures, the Erickson bill was formally endorsed. The Bone bill as amended was ratified and endorsed, after a bitter but futile fight to strike from it a provision authorizing municipalities to issue utility bonds without a vote of the people, where such bonds would not be a general indebtedness against the city or town.

The conference was attended by about thirty out of the two hundred persons invited, and was presided over by A. Emerson Cross. Delegates from the Seattle Municipal League, who were opposed to endorsement of the Erickson bill, walked out of the conference.

The Bone bill authorizes municipalities to sell surplus power outside of corporate limits, while the Erickson bill allows the organization of new power districts to develop and sell hydroelectric energy. Both the Bone and Erickson bills will now be prepared for filing and sent to Olympia, and the initiative petitions will be circulated together. The two bills will be campaigned for as one measure during the fight which will be waged against the Reed bill, which provides for a 5 per cent tax upon all power sold by cities when they sell outside of their corporate limits.

The Washington Superpower League, which is backing the Erickson measure, opened the Seattle campaign for signatures upon the proposed initiative measures, when Ralph D. Nichols, executive secretary of the league, in an address to the Seattle Labor Council, urged that organized labor endorse the measures and join in the support of the same both during the campaign for signatures, and then in the general election.

Norwood W. Brockett, director of public relations for the Puget Sound Power & Light Company, and spokesman for the Northwest Electric Light and Power Association, which is leading the fight of the private power companies, in a talk on the power question before the King County Democratic Club, criticized clauses in the Erickson bill that he interpreted as intended to confer on "public utility districts" created under the bill, if it becomes a law, large and virtually unrestricted authority to levy taxes and to issue general obligation as well as utility bonds. Mr. Brockett charged that advocates of the Erickson bill failed to enlighten the voters concerning taxing and bonding provisions of the measure that are of vital interest to all taxpayers and property owners, and declared that incorporation of these provisions in the bill indicated its supporters anticipated publicly owned power plants maintained and operated under the superpower league plan might have to resort to levy taxes and borrow money on the general credit of the taxpayers to meet deficits.

Mr. Brockett denied emphatically that the Seattle municipal lighting plant is responsible for the low light and power rates in Seattle, and stated that his company could supply every new demand for power in that district.

New Officers Named for Utility Information Committee

The Rocky Mountain Committee on Public Utility Information, which covers the states of Colorado, New Mexico and Wyoming, at its annual election recently held in its headquarters in Denver, Colo., re-elected William C. Sterne, chairman. R. M. Morris, general commercial manager for the Mountain



WILLIAM C. STERNE

States Telephone & Telegraph Company, was elected vice-chairman. V. L. Board, general superintendent of the Public Service Company of Colorado, was re-elected secretary-treasurer.

Mr. Sterne who, for many years, has been interested in the human side of the public utility industry, was one of the originators of the Rocky Mountain committee, which has been in existence since the winter of 1921-22. Mr. Sterne heads the Municipal Properties Investment Company, which operates in a half-dozen Colorado towns, the Summit



V. L. BOARD

County Power Company and the McCook (Neb.) Electric Company. He was graduated from Harvard and later entered the field of journalism. He became identified with the public utility industry in 1903, when he formed the Arapahoe Electric Light & Power Company. For a time he operated at Laramie, Wyo., but eventually confined his activities to Colorado and Nebraska. Mr. Sterne has been responsible for the inauguration of many of the most suc-

cessful activities of the Rocky Mountain committee.

Mr. Board, since he was graduated from the University of Missouri in 1910, has engaged in the utility business. His first experience was in the telephone field as a lineman and "trouble shooter" and later, as a member of the Western Electric staff, he was a line construction foreman. In 1912 he became identified with the Henry L. Doherty & Company interests and held various engineering positions in New York and Denver. In 1922, he became general superintendent of the Denver Gas & Electric Light Company. In October, 1923, upon the formation of the Public Service Company of Colorado, he became general superintendent of the consolidated properties.

Mr. Board was one of the organizers of the Rocky Mountain Committee on Public Utility Information. He is responsible for many of the good will building activities of the committee and in the company he represents.

Mazda B and C Lamp Prices Are Reduced 7½ Per Cent

Prices of Mazda B and C lamps, manufactured by the Edison Lamp Works of the General Electric Company and the Westinghouse Lamp Company, were reduced approximately 7½ per cent on Feb. 1. This is the fourth reduction in lamp prices that has been announced within the last two years. The first reduction was in April, 1922, and amounted to 9 per cent, the others were one in October, 1922, averaging 8 per cent, and a third in May, 1923, of 10 per cent.

This action is further evidence of the fact that improved methods of manufacturing can lower prices to the consumer, notwithstanding an increase in the cost of labor. The development of improved lamp-making machinery has offset the great increase in cost of labor and materials until now the prices of lamps average 30 per cent below the pre-war level.

The table following shows new Mazda lamp prices.

	Watts	
Mazda B	10-50	\$0.30
Mazda C	50	.40
	75	.50
	100	.60
	150	.75
	200	1.00
	300	1.60
	500	2.35
	1000	4.00

At the annual election of the Los Angeles, Calif., Electric Club the following were chosen to hold office during 1924: A. S. Moody, General Electric Company, president; F. E. Seaver, Los Angeles Gas & Electric Corporation, first vice-president; Ben G. Wright, Southern California Telephone Company, second vice-president; L. E. Moselle, Bureau of Power and Light, third vice-president; S. W. Murray, Illinois Electric Company, secretary-treasurer; L. R. Ardouin, United States Steel Products Company, sergeant-at-arms; D. C. Caselman, Builders' Exchange; F. E. Geibel, Pacific Electric Railway; Ross Hartley, The Electric Corporation; Arthur Kelley, Southern California Edison Company; C. T. Smallcomb, electrical contractor, and B. B. Vandercook, Western Electric Company, Executive Committee.

San Francisco Electrical League Elects Officers for 1924

The annual election of officers of the San Francisco Electrical Development League was held in the Palace Hotel on Feb. 11. C. T. Hutchinson, vice-president and general manager of the McGraw-Hill Company of California, was elected president and Curtis M. Lindsay, business manager of the Journal of Electricity, was elected secretary.

E. E. Browne, of Browne-Langlais Electrical Construction Company, San Francisco, A. E. Rowe of Garnett Young & Company, and H. W. Crozier of Sanderson & Porter, Inc., were elected directors for 1924.

Books and Bulletins

ELEMENTS OF STORAGE BATTERIES

By C. M. JANSKY and H. P. WOOD. 241 pages. 148 figures and illustrations. Published by McGraw-Hill Book Company, New York, N. Y.

The authors, who are associated with the University of Wisconsin, have prepared this text to be used in the industrial education series of the Extension Division of the University. The treatment throughout is elementary with a view of supplying the needs of the non-technical man who uses or operates storage batteries and who wishes to have an understanding of the maintenance and repair of such batteries. In view of the increasing use of this device and of the radical change in storage battery practice, a book such as this which combines specific discussion of storage batteries with the chemical and electrical principles involved, should prove of considerable value.

The first three chapters give a general description of the lead-acid storage cell, the fundamental electrical quantities involved and an elementary treatment of the chemistry of this device. A detached description of the nickel-iron-alkaline cell follows and a chapter is then devoted to the general characteristics of storage cells, followed by chapters on their charging and care. Equipment for charging is then described after which testing and maintenance is treated and the final chapter is devoted to the diseases of storage cells.

At the end of each chapter a recapitulation is given followed by a group of questions and problems. The text throughout is well illustrated.

E. R. S.

The initial issue of R.P.M., the official organ of the Electric Club of Seattle, Wash., was published on Feb. 1. The booklet, founded and edited by C. A. Osier, is of six pages and is devoted to personal items concerning the men of the electrical industry in Seattle. V. E. McCain, Western Electric Company; R. M. Cole, Economy Fuse Company, and L. R. Grant, Puget Sound Power & Light Company, are assistant editors of the booklet.

Meetings

Denver Electrical Men Hosts to Architects at Banquet

To cement the relationship between the electrical industry and the architectural profession and develop closer cooperation and better understanding between the two groups, the manufacturers' division of the Electrical Co-operative League of Denver, Colo., arranged an unique banquet and entertainment recently for local architects and draftsmen.

Although the affair was more or less of a venture in that section, it being the first time in the history of the electrical industry of the territory that a gathering of electrical men and architects was arranged, it was regarded as a 100 per cent success.

In the words of H. D. Randall, chairman of the manufacturers' division of the League and district manager of the General Electric Company, "the success of this get-together was most gratifying." Members of the division feel that much has been done to establish a greater consciousness on the part of the architectural fraternity of the magnitude and ramifications of the electrical industry and the importance of electricity in industrial and domestic life, due to this gathering.

No attempt whatever was made during the banquet at advertising nor was anything of an electrical nature placed on exhibition. Obviously the affair was designed to promote acquaintance.

Mr. Randall served as toastmaster and introduced the two speakers, one an electrical man and one a prominent architect. The first speaker, F. L. Easton, district representative of the Economy Fuse & Manufacturing Company, reviewed the purposes of the manufacturers in arranging the get-together. The reply was made by Robert K. Fuller, president of the Colorado Chapter of the American Institute of Architects.

Of importance to the electrical industry, locally as well as nationally, was the announcement by Mr. Fuller that "cooperation is the key to success"; that "architects need the cooperation of such groups as yours and others and should accept it," and also that a building congress, comprising representatives of all building industries in Denver, was being formulated.

He stated that the Electrical Co-operative League of Denver should be a component part of this organization, which is designed to serve as a clearing house for the whole building profession. Representatives will be named, it is expected, from the general contracting group, trades group, plumbing group, and so on. Details of this unique organization, which has the solid backing of the Colorado Chapter of the American Institute of Architects, remain yet to be worked out.

Expenses of the party for architects were underwritten entirely by the individual manufacturer members of the league. In addition to the honor guests,

members of the advisory board of the league attended. The evening program which followed the banquet included a number of special musical and dancing features.

Electric Club of Los Angeles Host at Banquet

About four hundred representatives of the electrical industry in the principal cities and communities of California attended the banquet given by the Electric Club of Los Angeles, Calif., at the Biltmore Hotel on Feb. 2, for the purpose of featuring the new electrical home in Los Angeles.

Richard E. Smith, president of the club, presented R. E. Fisher of the Pacific Gas and Electric Company of San Francisco, who spoke briefly on the accomplishments of the California Electrical Cooperative Campaign. Some of the points covered by Mr. Fisher were the electric home program, the cooperation in the electrical industry as a result of the campaign's activity, the necessity of adequate wiring, and the need for education of the public and members of the industry.

R. H. Ballard, vice-president and general manager of the Southern California Edison Company of Los Angeles, was presented as toastmaster. Mr. Ballard introduced Wigginton E. Creed, president of the Pacific Gas and Electric Company of San Francisco. Mr. Creed spoke on the subject of taxation, emphasizing the seriousness of the problem of tax-free securities. He explained the necessity for a revision of federal taxes and analyzed the plan of Secretary Mellon to attain this result. Mr. Creed

San Diego Electric Club Elects Officers for 1924

Officers for the year 1924 were elected at the Feb. 5 meeting of the San Diego (Calif.) Electric Club. The following men were chosen to serve for the coming year: G. H. P. Dellman, president; Hugo Kuehmstedt, first vice-president; Herb Rose, second vice-president, and Guy Miller, secretary-treasurer. K. B. Ayres, Fay Smalley, W. H. Talbott, Walter Wurfel and Jess Zweiner were elected to the board of directors.

Charlie Weiss, who represented San Diego at the Los Angeles Electric Club banquet at the Biltmore, gave a report of the meeting and the time he had, and a vote of thanks was given to the Los Angeles organization for the invitation which was declared appreciated even if circumstances prevented many from being able to attend.

At the previous meeting of the club, for which the election was delayed a week, E. W. Weathers provided the program. T. G. Armstrong, formerly of the McGraw-Hill Company, Inc., spoke on "More Power to California." H. R. Jackson, of the local Chamber of Commerce, spoke on "More Power to San Diego." F. B. Mitchell, of a city firm, spoke on "More Power to the Salesman." This meeting also included an entertainment program and was attended by a large crowd.

Idaho Engineers Conduct Annual Meeting at Pocatello

Engineers of wide reputation were numbered among the speakers at the annual convention of the Idaho Chapter of the American Society of Engineers, held at Pocatello, Idaho, Jan. 21 and 22. The convention was opened with the annual address of the president of the chapter, J. H. Wilson of Idaho Falls. J. Robb Brady gave the address of welcome in behalf of the city.

Various technical matters came up for discussion, and also the matter of urging more drastic laws concerning the licensing of engineers and the raising of the standard to exclude incompetent craftsmen. The delegates visited the Pacific Fruit Express Company's ice plant and the timber treating plant of the Oregon Short Line Railroad Company at Pocatello, and also were guests of the Idaho Power Company on a visit to their new hydroelectric development at American Falls.

The Municipal Light Department of Seattle, Wash., has reached an agreement with representatives of the Pacific Nitrogen Company to furnish that firm with electric current for its proposed \$250,000 chemical plant to be built in Seattle, and to represent an ultimate development of \$2,000,000. The first unit will be completed by September, 1924, and will require 1,000 kw. of current for its operation. The location of the plant has been pending arrangements for satisfactory current rate with the city light department, and a rate of \$30 per kilowatt-year has been agreed upon. Robert P. Greer, manager-director of the chemical company, states that ammonia will be the chief output of the first unit, and that construction work will start immediately. During the construction period, 500 kw. will be used.

COMING EVENTS

New Mexico Public Utilities Association—
Annual Convention—Albuquerque, N. M.
Feb. 18-20, 1924

Pacific Coast Division Electrical Supply Jobbers' Association—
Quarterly Meeting—March 6-8, 1924
Del Monte, Calif.

urged all citizens to study and analyze tax problems, federal, state and municipal, and to use the knowledge so acquired to vote intelligently on tax problems.

The Electrical Service League of British Columbia is now incorporated under the Benevolent Societies Act of British Columbia, certificate having been issued on Jan. 15. This permits the league to make contracts, hold property and otherwise conduct business without each member of the council or board of officers being personally liable for the whole amount. The financial year has been made to end on Dec. 31 instead of Sept. 30 as heretofore.

The Clavilux, a new device that projects a soundless composition of color, form and motion upon a screen, is to be presented for the first time in San Francisco on March 15. Two performances will be given by the inventor, Thomas Wilfred. The programs will be given under the auspices of the National League for Woman's Service.

Manufacturer, Dealer and Jobber Activities

Allis-Chalmers Company, Milwaukee, Wis., has recently issued a new catalog covering water wheel generators. This catalog will be furnished on request to the factory for Bulletin No. 1127.

American Wiremold Company, Hartford, Conn., has just brought out a new device called the Wiremold Bracket Convenience Outlet. This device is furnished with pigtails for connection to fixture joints under canopies and is intended to be fastened to the wall beside the fixture canopy or side wall bracket.

The Denver Radio Service Corporation has opened a new store at 639 Eighteenth Street, Denver, Colo., for the sale of radio equipment and supplies. The company is composed of A. G. Conter, Ralph H. Burr and A. G. Tubbs.

The Roller-Smith Company, New York City, has issued a new catalog on direct current portable instruments. The catalog covers ammeters, milli-ammeters, voltmeters, milli-voltmeters, galvanometers, etc., and will be furnished upon request to the factory.

The British Aluminum Company, Ltd., through its New York City office, is distributing its new catalog No. 171B dealing with aluminum busbars and connections.

The L. J. Wing Manufacturing Company, New York City, has prepared an interesting booklet on hand and stoker-fired turbine blowers. This is a publication of twenty-four pages and will be of interest to all who have use for forced draft equipment. It contains considerable engineering data not only on the application of these blowers to hand-fired boilers, but also goes into detail in discussing the application of these blowers to underfeed and chain grate stokers, showing how they simplify stoker installation. The booklet is well illustrated throughout and is now ready for distribution. Copies can be had by addressing the company.

The Ohio Brass Company, Mansfield, Ohio, recently purchased approximately five acres of land, and buildings, just across the Pennsylvania Railroad tracks from its present plant. The tract is triangular in shape and is bounded by three trunk-line railroads—the Pennsylvania, Erie and Baltimore & Ohio. The purchase was made from the Aultman-Taylor Machinery Company.

The Domestic Electric Company, Cleveland, Ohio, manufacturer of fractional horsepower motors, has recently announced that E. S. Sabin, Jr., has been appointed to the position of sales manager to fill the vacancy left by W. H. Lamar, who recently resigned from the position.

The R. Thomas & Sons Company, East Liverpool, Ohio, has produced an attractive booklet descriptive of the application of porcelain to various lines of industry.

The Marble Card Electric Company, Gladstone, Mich., has brought out a new line of ball-bearing a.c. motors. The line is constructed with particular reference to interchangeability of parts.

The Mutual Electric & Machine Company, of Detroit, Mich., manufacturers of "Bull Dog" safety switches, switchboards and panelboards, has announced the purchase of the plant of the Aluminum Castings Company.

The Mountain Electric Company, Denver, Colo., has moved into new and larger quarters at 1433 Lawrence Street, in that city. The offices and warehouse of the company will in the future be at the new address.

The Western Electric Company has recently placed on the market a new lighting unit known as "99 Safety Unit." The appearance of the new product is similar to the enclosing unit of the same number. The feature claimed for the new unit is the method of holding the bowl. This is done by means of concentric rings which are controlled by one knurled nut.

The Ohio Brass Company has recently published a four-page folder that is devoted to an explanation of a new line of trolley ears manufactured by the company.



Both Roy N. Phelan, secretary of the Electrical Contractors' and Dealers' Association of Sacramento, Calif., and C. V. (Cass) Schneider, of the Electrical Supply Company in that city and president of the association, are members of the Courteous Service Club and spend much of their time smiling. The sun seems to have been smiling a little too strong for them when their pictures were taken and that may be the reason that they have not recorded wider grins.

The Esterline-Angus Company, Indianapolis, Ind., has issued its bulletin No. 124 covering the new LR line of graphic meters.

Grant Gear Works, Boston, Mass., has recently issued its 1924 catalog and price list. The booklet can be secured by addressing the manufacturer.

Driver-Harris Company, Harrison, N. J., has recently published Catalog R-24. The booklet contains much valuable information relative to Nichrome and other electrical resistance alloys. Characteristics and properties of various resistance alloys are given in the catalog.

Betts & Betts Corporation of New York, N. Y., has recently announced that it has discontinued its regular sales force and in the place of this organization has established a series of manufacturers' representatives. The Globe Electric Supply Company, of Denver, Colo., will represent the manufacturer in the states of Colorado, Wyoming, New Mexico, Idaho and Utah, and the Panama Lamp & Commercial Company will act as Pacific Coast representative.

The Hurley Machine Company, Chicago, Ill., has announced that it is now ready to deliver, through its jobber, the Pacific States Electric Company, the new Hurley Superior vacuum cup washing machine. The machine has a capacity of eight double or ten single sheets.

Curtis Lighting, Inc., Chicago, Ill., has announced that the company has just completed the Curtis Building in that city. The building is a six-story office and factory structure and will accommodate the central offices and manufacturing plant of the National X-Ray Reflector Company, the X-Ray Reflector Company of New York, Inc., and Luminaire Studios, Inc., of New York and Chicago. The first five floors of the building will be used for manufacturing X-Ray reflectors and other lighting equipment made by the several concerns. The sixth floor will be occupied by the technical departments and executive offices. At the time of moving into the new building the three associated companies have been grouped under the new name Curtis Lighting, Inc. The companies will continue their activities under the new name without altering their policies or organizations.

The General Electric Company has developed a new enclosed automatic starter, the CR-7056-D1, of the primary resistance type, for starting polyphase squirrel-cage induction motors under light load. The resistance of this starter is proportioned to give an inrush current of $3\frac{1}{2}$ times the normal full load motor current, permitting the motors to develop at least 50 per cent, full load torque in starting. These starters are equipped with a single-step resistor, equal parts of which are connected in each phase. The switching elements consist of a starting contactor, a running contactor and a time-limit accelerating relay whose action is retarded by an alternating current magnetic drag. Overload protection is provided by a thermal overload relay. The starter is of the safety type, completely enclosed with a ventilated case. The time interval of the closing of the accelerating relay can be changed from approximately three to eight seconds. To shorten or increase the time interval requires but the turning of an adjusting nut.

Ralph B. Clapp, of Clapp & LaMoree, Los Angeles, Calif., is a recent visitor to San Francisco where the firm has a branch office.

Ray W. Turnbull and Ralph J. Cor-diner of the Edison Electric Appliance Company, Portland, Ore., are visiting Spokane, Wash., in connection with sales plans for this year.

G. A. Buckley, western sales manager of the Apex Electric Manufacturing Company, with headquarters in Kansas City, Mo., recently spent several days in Los Angeles, Calif., in the interest of representative of the purchasing depart-

Personals

Hugh M. Ferguson, manager of the Salt Lake division of the Utah Power & Light Company, who was recently elected chairman of the advisory committee of the Rocky Mountain Electrical Cooperative League, has a wide experience in the construction, operation and commercial phases of the public utility field. He graduated in mechanical en-



HUGH M. FERGUSON

gineering from Cornell University in 1903. Immediately after graduation he became associated with the Westinghouse Electric & Manufacturing Company in the erection of electric stations, a large part of his work being in the West and Northwest. In 1908 Mr. Ferguson became identified with the properties of former Senator W. A. Clark in western Montana, with headquarters at Missoula. Here he was engaged in the construction and operation of water power plants and steam heating systems, and eventually his activities also extended to the commercial department of the electrical business. In October, 1916, he left the Clark properties to become associated with the Utah Power & Light Company, where he was placed in charge of installing and developing that company's steam heating system which serves the commercial section of Salt Lake City. In February, 1919, he was promoted to the position of manager of the Salt Lake division of the Utah Power & Light Company, in which capacity he also retains supervision of that company's steam heating business. Mr. Ferguson is very active in League affairs, and has initiated many valuable ideas which have resulted in considerable benefit to the electrical industry in its local activities.

E. E. Anderson has been made sales manager for the Middle West territory for the Majestic Electric Appliance Company, San Francisco, Calif.

R. L. Bayne, assistant to the sales manager of the cedar department of the Weyhauser Sales Company of Spokane, Wash., was recently in Los Angeles on a business trip in the interest of his company.

E. S. Scofield, formerly in the engineering department of the Washington Water Power Company, Spokane, Wash., has been made assistant industrial engineer in the sales department.

Curtis M. Lindsay, business manager of the Journal of Electricity, San Francisco, Calif., has been elected secretary of the San Francisco Electrical Development League.

Edgar Parker, advertising manager for the Ward Motor Vehicle Company, New York City, has been appointed chairman of the publicity committee of the Electric Transportation Bureau of the National Electric Light Association, succeeding Ralph Neumuller, resigned.

Miss Eleanor Hanning, formerly assistant cashier in a Chewelah, Wash., bank, has been appointed an assistant cashier for the Washington Water Power Company.

Theodore Varney, electrical engineer of the Aluminum Company of America, Pittsburgh, Pa., is a recent visitor to the Pacific Coast, having spent some time in San Francisco and Los Angeles.

George B. Thomas, educational director of the Western Electric Company, New York City, has returned to New York after an extended trip over the Pacific Coast. Mr. Thomas spoke before the San Francisco Electrical Development League before leaving for Los Angeles where he attended the national radio exposition held in that city.

C. V. Allen, for many years publicity manager and representative of the securities department, Puget Sound Power & Light Company, Tacoma, Wash., has been promoted to the Seattle office, where he will be associated with Capt. Norwood W. Brockett in the public relations service work of the company. Mr. Allen will be succeeded by C. S. Reynolds in the publicity work in Tacoma.

Capt. Norwood W. Brockett, director of public relations for the Puget Sound Power & Light Company, Seattle, Wash., recently spoke at the King County Democratic Club, Seattle, and before the Chamber of Commerce of Puyallup, Wash., discussing the various power bills now before the voters of the State of Washington.

G. M. West, electrical engineer of New York City, was a recent visitor to San Francisco.

J. W. Baker, who has been employed by the Interstate Utilities Company, Spokane, Wash., and its predecessors since 1908, has been made commercial superintendent of the company. Since June, 1921, Mr. Baker has been assistant superintendent in charge of new business and public relations, and prior to that time was district manager at Wallace, Idaho.

James R. Cravath, pioneer illumination engineer, formerly of Chicago, Ill., and now of Richmond, Calif., was recently in receipt of a check from his former colleagues for the purpose of starting a new technical library to replace the books burned in the Berkeley, Calif., fire. The check was accompanied by a letter signed by 47 former business associates.

Martin L. Pierce, manager of the research department of the Hoover Company, Akron, Ohio, was the principal speaker at the weekly membership luncheon of the Salt Lake City Chamber of Commerce on Jan. 30, 1924.

Charles W. Helsler, president of the California Development Association and for the past eight years vice-president and manager of agencies for the West Coast Life Insurance Company, San Francisco, Calif., has resigned from that company following his election to the presidency of the Majestic Electric Appliance Company. Mr. Helsler will in the future devote all of his time to the developing of this company and its affiliated organizations. Since Mr. Helsler's election to the presidency the Majestic Electric Appliance Company has opened executive offices in the Rialto Building, San Francisco, Calif. The factory and sales offices will remain at 590 Folsom Street, San Francisco.

L. M. Nichols has been appointed assistant to the general merchandise manager of the General Electric Company and J. O. Wetherbie has been made field supervisor of that department.

E. E. Browne, of Browne-Langlais Electrical Construction Company, San Francisco, Calif., has been elected a director of the San Francisco Electrical Development League for the year 1924-1925.

Grace T. Armstrong, of the Russell Electric Company, Chicago, Ill., manufacturers of electric appliances, was a recent Los Angeles visitor where she was active in demonstrating the appliances made by the company which she represents.

K. E. Van Kuran, district manager of the Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., has just been made general chairman of the Convention Committee of the Pacific Coast Electrical Association. Mr. Van Kuran is one of the conspicuous members of the electrical industry in the West and has long been one of its leaders. In addition to his commercial duties he finds time for constructive plans and



K. E. VAN KURAN

cooperative organizations, giving his time freely for the development of the business and the improvement of conditions. He has been president of the Los Angeles Electric Club and has served as vice-chairman of the Advisory Committee of the California Electrical Cooperative Campaign. As general chairman of the Convention Committee Mr. Van Kuran will have charge of all arrangements for the annual meeting of the association which will be held in June.

P. H. Booth, district manager of the Edison Electric Appliance Company, with headquarters in Los Angeles, Calif., recently visited San Francisco on his way to Portland, Seattle and other northern cities.

H. D. Randall, of the General Electric Company, Denver, Colo., and **E. A. West**, of the Denver Tramway Company, Denver, Colo., have been elected to the board of directors of the Denver Electric Cooperative League.

E. W. Botts has been appointed auditor for the Majestic Electric Appliance Company, San Francisco, Calif.

H. W. Woeber, representative in the Rocky Mountain territory for Landers, Frary & Clark, New Britain, Conn., has been transferred to Salt Lake City, Utah.

Joseph Sweeney, salesman in the St. Maries, Idaho, office of the Washington Water Power Company, has been transferred to the sales department of that company at Spokane, Wash.

V. L. Board, general superintendent of the Public Service Company of Colorado, Denver, Colo., recently spoke before the Denver chapter of the American Institute of Electrical Engineers, taking as his subject the engineering features of his company's business.

R. M. Morris, the recently elected vice-chairman of the Rocky Mountain Public Utility Information Committee, became identified with the telephone industry in Kansas in 1903. He joined the staff of the Mountain States Telephone & Telegraph Company in 1905. In 1911 he became district manager at Durango, Colo., where he remained until 1916, when he became a member of the engineering department in Denver. In 1917 he became division commercial superintendent at Helena, Mont. In February, 1920, he was summoned to Denver to become a special representative of the vice-president and general manager, and was made commercial



R. M. MORRIS

engineer in March of the same year. In January, 1923, Mr. Morris was appointed general commercial manager of the entire Mountain States territory, which covers Colorado, Montana, Idaho, Utah, New Mexico, Texas, Wyoming and Arizona. Mr. Morris has been identified with all of the educational activities of the Rocky Mountain committee, and more especially among the universities and colleges of Colorado, where the committee has inaugurated public utility courses.

W. C. Sterne, of the Public Service Company of Colorado, Denver, Colo., **S. W. Bishop**, executive secretary of the Denver Electric Cooperative League, and **George E. Lewis**, director of Rocky Mountain Committee on Public Information, have been unanimously re-elected to the positions of chairman, vice-chairman and secretary, respectively, of the Electrical Bureau of the Denver Civic and Commercial Association.

K. C. Wright, of Brigham City, Utah, and resident engineer of the Utah state road commission, was chosen as vice-president of the Ogden, Utah, chapter of the American Association of Engineers for the year 1924.

L. A. Francis, of Seattle, Wash., formerly representative on the Pacific Coast for the Gillespie-Eden Corporation, Patterson, N. J., has been appointed representative in northern California for the Automatic Electric Washer Company, Inc., Newton, Iowa. He will make his headquarters at San Francisco.

Theo. Waage, of the Waage Electric Company, Chicago, Ill., left on Feb. 9 for a trip to the Pacific Coast.

Prof. Elihu Thompson, one of the founders of the General Electric Company, Schenectady, N. Y., and among the world's prominent engineers, has been awarded the Lord Kelvin gold medal. The award was made by the American and British Engineering Societies acting jointly. Prof. Thompson will go to Europe during the summer of 1924 to receive the award.

P. B. Miller, of the Simplex Electric Heating Company, Cambridge, Mass., has been transferred from the south Atlantic states to the Pacific Coast to succeed **R. C. W. Libbey**, resigned. Mr. Miller will make his headquarters in San Francisco, Calif.

Charles Weiss, **Phil Mayer**, **Howard W. Thomas**, **Boyce C. Jones**, **L. M. Wall**, **Wm. A. Cyr**, and **Sam Hall** were among the San Diego delegates to the Los Angeles Electric Club banquet and dance at the Biltmore Hotel Feb. 2.

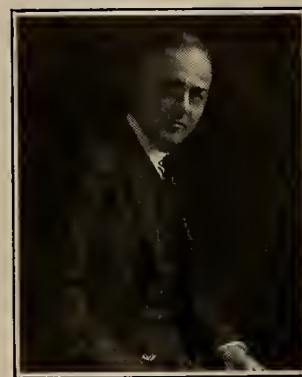
Dr. Elwood Mead, a member of the United States government fact-finding commission which recently held hearings in Salt Lake City, Utah, on reclamation matters, was the principal speaker at the weekly luncheon of the All Engineers' Club in that city on Jan. 21. Dr. Mead told of his work as reclamation engineer in Australia, where for a number of years he served as a member of the state rivers and water supply commission of the Australian government. He told of the practical application there of scientific methods of aided and directed land settlement.

Robert F. Bohn, for several years with the engineering department of the Southern California Edison Company, Los Angeles, Calif., has been made assistant engineer with the Imperial district of the Southern Sierras Power Company, working under **F. D. Morgan**.

B. A. Wagner, of Electric Agencies, San Francisco, Calif., is on an extended trip to eastern cities visiting factories which his company represents.

John C. Brown, county surveyor of Weber County, **O. C. Lockhart**, and **Joseph M. Tracy**, city engineer of Ogden, Utah, have been elected directors of the Ogden chapter of the American Association of Engineers for 1924.

H. V. Michener, recently appointed manager of the telephone department of the Western Electric Company, Los Angeles, Calif., has been with that company for over seventeen years. He joined the company immediately after coming out of college in 1906 and was attached to the Pittsburgh, Pa., office. After spending several years at the Pittsburgh office he was transferred to the comptroller's office in New York City. Two years later he was again transferred, this time to the staff of the chief stores manager. During his connection with this department he visited over 75 per cent of the branch offices of the company, thus becoming familiar with conditions throughout the



H. V. MICHENER

country. In 1915 Mr. Michener was transferred to the Seattle, Wash., supply department as stores manager for the Northwest, with supervision over the Seattle, Portland, Tacoma and Spokane branches. In August, 1921, he was made Pacific Coast stores manager for the telephone department, with headquarters at San Francisco, Calif.

Harry Sadenwater, radio engineer of the General Electric Company, Oakland, Calif., and the man who was responsible for the installation of the new radio station KGO, spoke before the Oakland, Calif., Electric Club on Feb. 11, on the subject of "Present Radio and Possible Developments."

John L. Scudder, of Ogden, Utah, has been elected secretary; **Ernest Gilgen**, of Ogden, has been elected assistant secretary, and **F. W. Smith**, of Ogden, has been elected treasurer of the Ogden chapter of the American Association of Engineers.

E. J. Crosby, a Spokane, Wash., newspaper man, has been appointed assistant to **Gilbert Foster** of the publicity department of the Washington Water Power Company, Spokane, Wash.

H. F. Dicke, manager of the Utah Light & Traction Company and member of the board of governors of the Salt Lake, Utah, Chamber of Commerce, represented Salt Lake City at the recent conference of the United States Chamber of Commerce in San Francisco.

E. E. Brazier, sales manager of the Capital Electric Company of Salt Lake City, Utah, presided at a recent luncheon of the Salt Lake City Chamber of Commerce which was attended by about 300 business men of that city.

Trade Outlook

San Francisco

Recent snows in the mountains and rains in the lower altitudes have materially added to the general improvement in business conditions which has been noted. Water reserves for next summer are still far from normal requirements but it is anticipated that climatic conditions will prove favorable.

Real estate movement continues together with industrial and domestic construction work and the demand for materials still holds strong. Jobbers report continued heavy buying, particularly in electrical supplies and merchandise. Labor is well employed and the normal ratio of supply and demand seems well maintained. Several new manufacturing plants are locating in the Bay district and these, with railroad development, are serving to absorb common labor.

Interest rates remain unchanged and money is available for commercial and industrial development. Credits are flexible and are not materially affected by the slight reduction in exports.

Portland

January business figures justify the forecasts made at the end of 1923 for continued good business in 1924.

Taking the activities of the public utilities as an index of what is ahead, we find that they are planning to spend some \$10,000,000 or \$12,000,000 during the coming year. The total investment in the public utilities of Oregon is now placed at about \$150,000,000 and is expected to double in the next six years. The Portland Railway, Light & Power Company will of itself require some \$50,000,000 or \$60,000,000 in that time. All this is an indication of rapid growth of business generally and of strong confidence in the future. The success of the "customer ownership" method of financing industries seems to be assured in the State of Oregon.

Following the holiday slump, the lumber market is back strong. In January it broke all former records with an export of nearly 54,000,000 ft., a gain of 200 per cent over January, 1923. About 50 per cent of the output of the mills is moving by water.

During January, 1924, building permits were about the same as a year ago. Bank clearings, however, gained 14 per cent and exports, with a total of \$5,565,480, were fully 100 per cent over January, 1923.

Los Angeles

Business conditions in Los Angeles are quite satisfactory for this season of the year, though there has been some little reaction since Jan. 1, with retail sales showing a slight decline from the previous month.

In the electrical industry business remains good, though retail sales have fallen off slightly during the past two weeks. However, they show an increase over the corresponding period of a year ago.

In the wholesale business, jobbers and wholesalers report very good business conditions prevailing, which as usual is accounted for by the building program under way, which is somewhat ahead of last year.

Recently several large orders for generating, switching and transformer equipment have been placed in the Los Angeles territory. The sale of industrial apparatus and supplies is particularly gratifying and well up to expectations.

Building permits issued during the last half of January, 1924, numbered 3,140 with a valuation of \$7,915,218, as compared with a valuation of \$7,018,781 for 2,700 permits issued for the corresponding period in 1923. This is an increase of approximately 13 per cent and does not show the huge increase over the preceding year as was the case of the year just ended.

Bank clearings continue to run well ahead of 1923, with an increase during the past two weeks of 22 per cent over the same period of last year.

Denver

Reports on the business conditions of this territory made in these columns at the beginning of the new year have been substantiated by recent government statistics on certain basic industries of the region.

Bank deposits for 1923 exceeded the previous year by 7.8 per cent while building permits increased 9.1 per cent. Crude oil production gained 13 per cent and grain production of all kinds jumped 31 per cent. Colorado's metal mining industry had an accredited output valued at \$21,596,453, an increase of 4.3 per cent.

The Public Service Company of Colorado leads other utilities of the region in new construction work. In Denver alone the company announces a \$2,221,447 building and improvement program.

With the exception of the usual mid-winter slump in the employment of unskilled labor and clerical workers, every economic factor points to the present year being even a better one for business than 1923. Electrical men, in general, are optimistic over the outlook.

Seattle

Retail and wholesale trade of Seattle and the Puget Sound district is slow following the holiday period, but figures show that it is holding up well as compared with other years. Collections in 1923 showed a higher percentage total, as well as a larger volume, than those in 1922. Jobbing trade is preparing for an exceptionally active spring and summer business.

Construction is holding up in good shape, and the mild weather conditions existing all during the winter have permitted continuous activity in all lines. The month is featured by several large new apartment structures, in each case electrical equipment to be used throughout.

Lumber prices are holding firm, with heavy demand from the Atlantic seaboard and California.

Central stations report a very satisfactory year and splendid prospects for 1924. The improvements and extensions planned by the various power companies throughout the Washington district indicate a big demand for large and small equipment. Practically every power company in the Puget Sound district plans extensive additions. Prices in all lines are holding firm, with deliveries satisfactory.

Spokane

All industrial lines are in good condition, but there has been the usual seasonal slump in retailing during the past month. The local lumber industry, in general, faces a good year.

The development of Spokane into a major market for live stock is indicated by the increase in the number of carloads received at the stock yards.

An outstanding event of the mining industry in the Northwest for the month of January was the finding of an important vein by the Ajax Mining Company. This property, an important silver-lead producer, adjoins the Hercules near Burke, Idaho. Where intersected the vein showed 14 ft. of milling ore with streaks of high grade material. The strike is regarded as one of the most important in recent years and has done a great deal to stimulate renewed interest in metal mining in the Coeur d'Alene district. An event of almost equal interest was a strike made in January at the Old Dominion mine near Chewelah, Wash. Lead was recently quoted at \$8.15, with refiners behind in deliveries. One of the best years in mining history for Spokane is expected in 1924.

The sale of electrical appliances for 1923 in this territory is estimated by one of the local papers to amount to approximately \$1,250,000.

Salt Lake City

In some sections of the intermountain territory there has been the usual seasonal curtailment of activities in agriculture, highway construction and building, which has caused a temporary surplus of workers of nearly all classes, affecting mostly common labor. However, an indicated strong revival of these industries in the early spring will cause absorption of all workers now affected.

This condition does not prevail, however, in the mining and industrial centers where metal mining, other than silver, and particularly of copper, continues active. Generally speaking, residential, commercial and industrial building continues moderately active despite some curtailment due to winter weather. Industrial concerns, other than those working on a seasonal basis, are operating steadily.

A number of new industries are locating in Salt Lake City and adjacent territory, and many inquiries are being received from prospective sources in regard to conditions affecting their establishment in this locality.

Electrical jobbers, dealers, and merchants in general are anticipating an exceptionally good year.

Collections are reported to be better than for some time.

Journal of Electricity

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March 1, 1924

San Francisco

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Retail Outlets

WHO are the outlets for the electrical manufacturers' products? What are their relative importance? Is the public being served to the best advantage?

These are some of the questions which will be answered in the next issue of the Journal of Electricity. E. A. Kincaid, whose articles describe the results of a survey of electrical distribution on the Pacific Coast, makes some startling disclosures in his next article. It is easily the best and most important of any he has written. Discussing the contractor-dealer, Mr. Kincaid says:

"Some hold that he is neither contractor nor merchant but an economic incongruity, the manifestation of industrial change and the product of undirected growth and expansion of the industry. Others say that he is the logical outlet for electrical goods, that he should be fostered and encouraged as an indispensable factor in the distribution of electric goods. . . . The truth must be found somewhere between these two extremes."

Many vital questions on the subject of distribution are answered. Speaking of margins, Mr. Kincaid says:

"There are those who say that it is all a question of margins. The retail margins are too narrow, profits cannot be realized and the right type are not attracted to the business. This approach to the question is just the reverse of what it ought to be. Are the margins to be so adjusted that even a lineman can merchandise with success? If so, then the cost of distribution will rise. . . . and the problems of the industry be aggravated."

So important do we feel this article that we recommend every man in any way connected with the distribution of electrical products to study it carefully. Watch for your next issue. It will be a red-letter one.

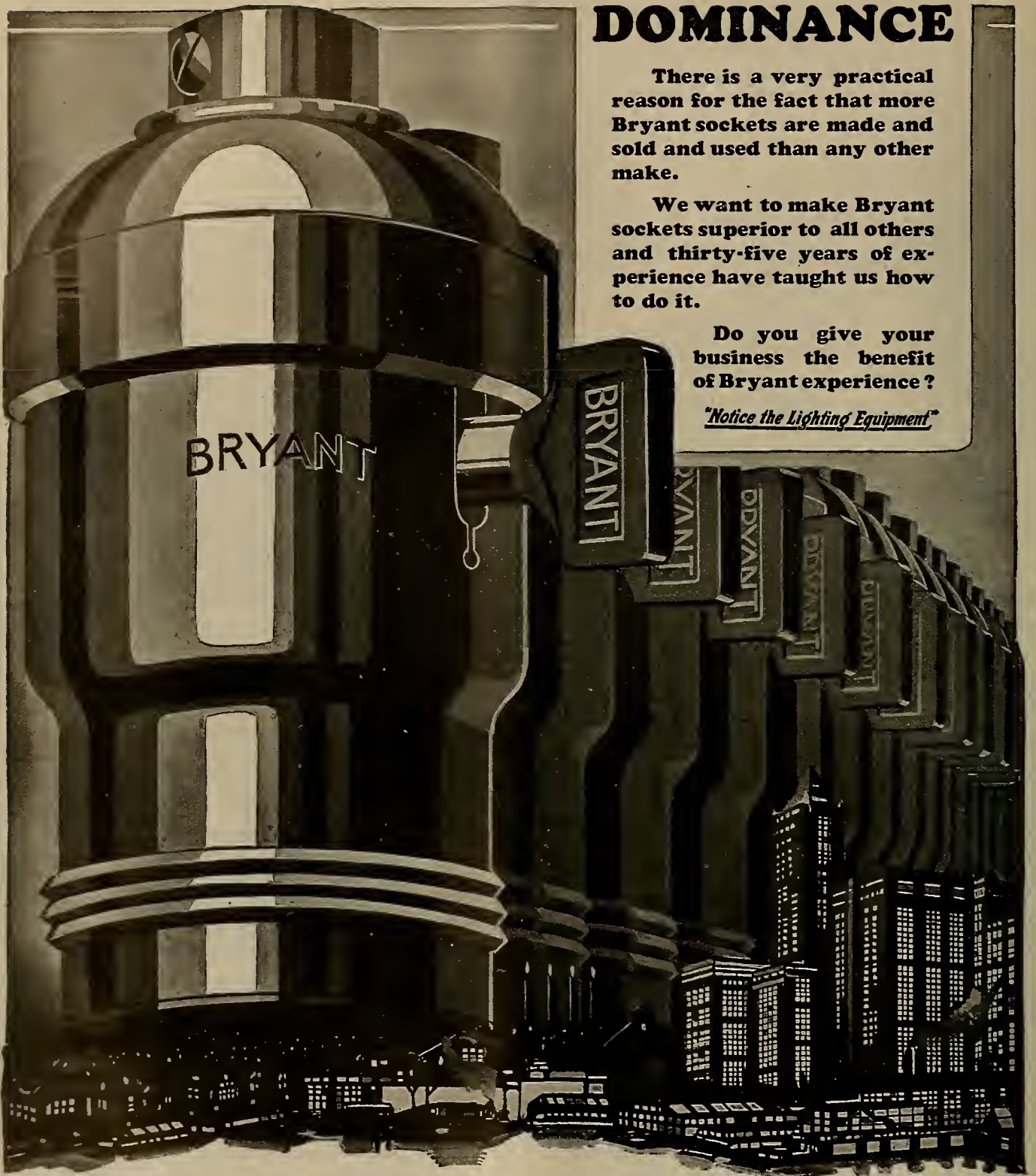
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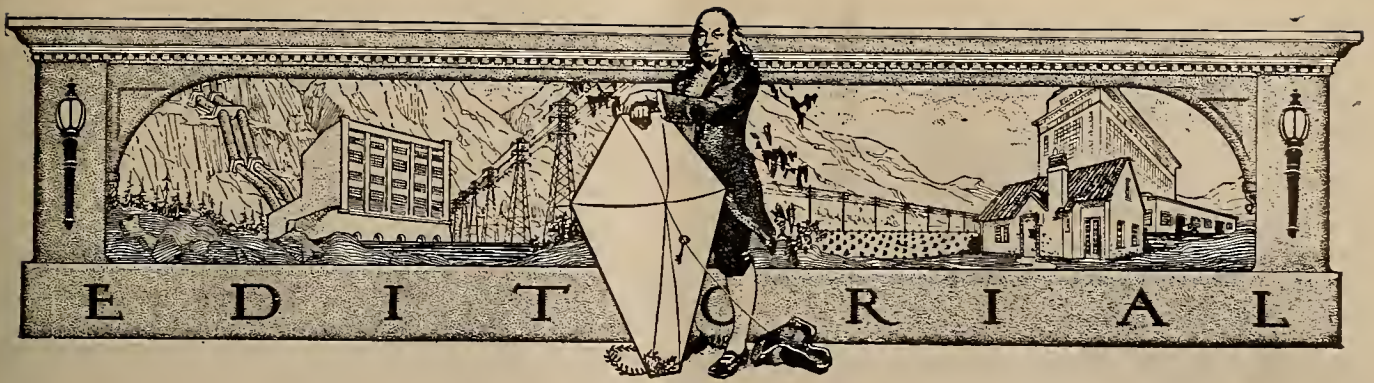
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Starting and Finishing

THERE are two major components that make up a horse race, or any other kind of a race—a start and a finish. This is equally true of life itself, in which there are many starters, but not nearly so many finishers. Some people are so busy starting things that they never finish any of them. However, a truce to philosophical abstractions. Let us get down to business.

CONSIDER the “Smiles” campaign. It has been started, well started. The committee of the Public Relations Section of the Pacific Coast Electrical Association charged with it has done a good job in this particular. It has devised the plan, a plan that has already received national recognition as embodying something really unique in the public relations problem. It has prepared the literature, told the story to the industry, and launched the enterprise in a manner wholly commendable.

WE hope, now that the first flush of enthusiasm has had a chance to subside, that this movement is not to be allowed to languish and perhaps die from lack of nourishment. Cynics are already shrugging their shoulders with

an “I told you so” expression on their faces. They look to see the “Smiles” movement go up like a rocket and come down like a stick.

THIS is a responsibility of the electrical industry as a whole. The committee has done everything and more than could be expected of it. There is no reason whatever why every living person within the industry, whatever his capacity or place in the organization chart, should not be wearing the button on his lapel and the smile on his face. There are those who think the button is the beginning and end of the “Smiles” movement. It may be, and is, the beginning, but, rightly, there should be no end. It is primarily an idea, a thought, that should so impress itself upon the consciousness of everybody as to become an integral part of his character.

THIS is a good opportunity for those who claim the qualities of leadership to justify their claim by lending their energies in full measure toward the consummation of that ideal of Courteous Service of which the little red button is the outward, visible sign.

Education and Public Relations

EVERY university and college in Colorado, and approximately 100 high schools in the territory covered by the Rocky Mountain Committee on Public Utility Information are now conducting public utility courses, according to a recent statement made by George E. Lewis, executive manager of the organization. In discussing the work of the committee Mr. Lewis said:

"The universities and high schools are virtual treasure-chambers of good will for the utilities. The students are quick to grasp utility subjects; they are easily interested, and they readily carry their new opinions and convictions into their home circles. It has come to the notice of the committee that entire families have revised their opinions and sentiments toward the utilities as a result of enlightenment on the part of student-members of the family."

Four booklets are published by the committee for use in the high schools. They are "The Romance of Electricity," "The Romance of the Telephone," "The Romance of Gas" and "The Romance of the Trolley." These booklets are not being circulated among the students except in rare cases. Instead, local managers of the utilities are presenting the subject matter before classes and assemblies.

Another feature of the committee's work consists of the promotion of newspaper advertising as a means of building up public understanding and friendship. The committee regularly prepares copy which is circulated among all utilities in the district, whether members or not. In 1923 approximately 100,000 in. of good-will advertising appeared in the papers of the region.

From the standpoint of results the committee is justifying its organization. In addition, it is setting a worthy example for other similar bodies to follow. Greater even than this, it is proving that education along utility lines is sorely needed; that means for providing that education are at hand; and that the public is receptive.

Study of Electric Heating Load Needed

DOMESTIC and commercial electric heating has been made the subject of considerable discussion among central station men. In certain sections of the country, notably in California and in one or two other Pacific Coast states, its development has been marked. In other sections its application has been ridiculed, and it has been placed in the same category as "cold light" and perpetual motion. This development in electric heating, in most cases, has been in spite of and not because of the central stations. Manufacturers, jobbers and dealers have done most of the pioneering. New products have been developed, educational advertising sponsored and practically all of the sales work done by this group.

In sections where this work has been performed rapid progress has been made. Carefully directed sales efforts have been productive of results. Such arguments as the refinement of electric heating, its

safety, comfort, convenience and ease of application, have met with almost immediate public response. A large number of installations have been made as a result. Homes and commercial buildings are now electrically heated. In particular, the application has been successful in apartment buildings. Several schools are electrically heated and there is talk of heating entire office buildings in this manner.

Despite all this, many power company executives either smile or shrug their shoulders when the subject of electric heating comes up for discussion. Their attitude seems marked with indifference and in most cases, this indifference is based upon a lack of definite knowledge of the subject. Such primary factors as diversity, revenue for kilowatt-year, high and sudden demand requiring sufficient capacity to take care of the maximum and other moot points never have received sufficient study to convince these executives of the desirability of this load.

Sufficient installations have been made, or will have been made in the near future, to furnish ample opportunity for a detailed study of the subject. Only by means of such a study can definite information be secured. Certainly some such investigation is needed to settle many of the points under discussion. Either a committee from the National Electric Light Association or one of its regional branches should be assigned the task and provided with the necessary funds to make a study of this nature.

Western Industry and Western Waste

FOREIGN economists who visit America are nonplused at what they term our greatest vice—waste. They look aghast at our waste of time, money, materials, effort and opportunity. The ordinary American citizen, with a shrug of the shoulders, dismisses their criticism with the statement, "Our standard of living is responsible." The real waste is not with our individual citizens. It is with industry. There are certain phases of our industrial life here in the West that are excellent examples.

Practically all of the Western states are rich in natural resources. Few sections of the world produce a greater variety or a larger quantity of raw materials. The utilization of these natural resources and the production of raw materials furnish employment to thousands of workers, produce great sums of money. They are an industry in themselves. Yet they are not factories. Most of the factories belong to the Atlantic Coast or to the industrial centers of the Middle West. We ship our raw materials—wool, cotton, minerals, leather and the like—to Eastern mills, where they are fabricated and then shipped back to be purchased and used. We pay the freight both ways. We countenance the waste.

The West has an abundance of electric power for turning the wheels of industry. It has every natural advantage, including the door to the greatest potential market in the world—the Orient. Living conditions are better; climatic conditions are unexcelled. There is no economic reason why Western raw materials should not be fabricated in Western cities.

Out of this economic error will one day come opportunity. We shall have many factories. The demand for raw materials will increase. Cities will grow; back country will develop. In a word, we will enjoy a greater prosperity than is our measure today.

The Pot of Gold at The End of the Rainbow

LIKE the pot of gold at the end of the rainbow are the promises of the Public Ownership League of America. In a recent interview, Carl D. Thompson, secretary of this organization, described in the following phrases some of the results to be achieved if the "superpower" system fostered by this organization is completed:

"Light your home, cook your meals, wash and iron your clothes, run your sewing machine and clean your house all by electricity for less than a dollar a month!

"Get electrically the equivalent of 120 hired men on your farm for 60 cents a day!

"Electricity will be so cheap that it will not pay to install meters and keep accounts."

America seems to be particularly blessed—or cursed—with this type of mind. Men go about, chasing rainbows, blowing bubbles, with no regard to fact. For the most part, the public looks on and smiles. Perpetual motion, communication with Mars and transmuting base metals into gold are some of their pet schemes. They flit about, aimlessly, like butterflies, cause a slight ripple on the surface of life, and are gone. Their theories, like bubbles when pricked, are found to be full of hot air.

Courses for Employees Have Many Advantages

COURSES of instruction on various phases of the electrical industry are offered from time to time by either the National Electric Light Association or one of its regional subdivisions. During the last year there have been classes for electric truck salesmen both in the East and on the Pacific Coast. It has been customary also to offer classes for meter men in several cities. An announcement has just been made that such a course will be given in Denver under the auspices of the Public Service Company of Colorado and the state university during the coming month. Intensive instruction of this nature has many advantages, for it supplements the practical experience gained by the men in the field. Central station executives in the region adjacent to the city where the course is to be given should see that every opportunity is afforded their employees to take advantage of the classes.

Light Opera de Luxe

WHO says there is nothing new under the sun? Now comes the Clavilux, also called a "Color Organ," an electrical device that projects what is called mobile color upon a screen. It is manipulated from a keyboard, like the console of an organ, and

produces a riot of color that forms a silent composition of great beauty.

It is really, so we are told, the expression of music through the color motif. It takes form and rhythm; in fact it conveys to the senses of the spectator much the same thrill afforded by the dulcet tones of a Tetrassini, or the stentorian basso of a de Reszke or a Plancon.

This is great news for the Intelligentsia. How they will revel in this new sensation! Down with the futuristic and cubist expression of pictorial art, away with Bakst and Erte, out with Einstein and his relativity; the bobbed haired, be-smocked Greenwich Villagers have a new cult.

If music may be presented in soundless color, why should not the kilowatt, public relations and government ownership be presented in the same manner? Let the kilowatt be a delightful shade of blue, public relations a delicate pink, and government ownership a flaming red. Let there be light.

The Federal Power Commission Might Employ the Navy Publicity Man

PUBLICITY is a powerful weapon when properly wielded. It has made men; it has broken others; and it has been unscrupulously used to foist unjust measures upon an unsuspecting and gullible public. Publicity, labeled as such, is legitimate. Publicity used to impute motives or to mould public opinion upon questionable subjects is propaganda and should be frowned upon. The public, however, is not in a position to discriminate between the two.

Take, for instance, the recent newspaper talk about the trip of the new navy dirigible to the North Pole. Columns were published on the subject. The Navy Department was successful in securing thousands of inches of national publicity. Now the trip has been called off for one reason or another. An expert on aviation has told us that the trip was never planned to be carried through; that it would have been impossible; that, in a word, the department was only seeking to build up a wave of favorable public opinion. And why? Congress is in session. Appropriation measures are up for consideration. The Navy Department wants its share.

Consider, on the other hand, the Federal Power Commission. Charged with the administration and supervision of the national water power resources, this organization has been forced to function under difficulties from its inception. Undermanned and under-financed, it has struggled along, getting help from such other departments as it was able. Attempts to secure additional funds in the form of an appropriation have proved unavailing. From all appearances the commission will be forced to continue to exist in its present hand-to-mouth fashion.

Perhaps someone can suggest a circus publicity stunt which will direct attention to the Power Commission. It has no Shenandoah to send to the North Pole. Perhaps if one of its engineers were to ride the rapids of the Colorado River canyon on a surf board Congress would look with more favor upon the commission's appeal for funds.

CURRENT COMMENT



Some of the objectionable features of the proposed Erickson bill for public ownership of hydroelectric utilities in Washington are already being recognized by the press of that state. Certain militant editors whose policies are directed from national headquarters are working diligently for the measure whereas others, realizing the dangers of such a socialistic move, are already presenting arguments against it. Some of the particularly obnoxious features of the bill are outlined in the following editorial from the Spokane, Wash., *Spokesman Review*:

This is a highly socialistic measure that would set up a commission of five autocrats and confer upon them unprecedented and dangerous communistic authority to put out vast bond issues without the consent of the public, and to levy heavy additional taxes without public approval.

Under the Erickson bill the state is not to be the power-developing and power-owning authority; nor the counties; nor the cities or towns. A new and dangerous super-government would be set up, and the end of the reckless experiment no man can foresee.

The advocates of the measure intimate a purpose to cut the state into two "public utility districts"—one east of the Cascade Mountains, the other west. The bill is so framed, however, that the entire state could be taken into a single "public utility district," and the extent of the district or districts would be whatever the advocates of this bill want it to be, for they have the organization and purpose to determine that.

If it should suit their purpose to make the state into one big district they would have only to present a petition for an election to the secretary of state, to be signed by "not less than 500 qualified electors in all class A counties, 250 in all first and second class counties, and 100 in all other counties." King County (Seattle) is the only class A county, and Pierce (Tacoma) and Spokane are the only first and second class counties. So a petition signed by 500 socialists in King County, 250 socialists in Spokane and Pierce Counties and 100 socialists in each of the other counties of the state, would throw the public into the turmoil of a public ownership election.

The powers of the public utilities district thus organized would be exercised by a commission "consisting of a president and four commissioners." Here are some of the unheard-of powers that are to be conferred upon five men:

The commission, merely by resolution, could contract indebtedness equal to 1½ per cent of all the taxable property in the entire district.

This board of five men would be given the further power to levy annual taxes upon all the property in the district, for the bill expressly provides that they shall be authorized "to raise revenue by the levy of an annual tax on all taxable property in such public utility districts, not exceeding 2 mills in any one year, exclusive of interest and redemption for general bonds."

This means that the commission could make an unlimited levy for bond interest, or bond redemption, and could make a further levy of 2 mills each year to cover any deficit that might result from their bad judgment, mismanagement or dishonesty.

These are only a few of the dangers lurking in this communistic measure that is sponsored by the same men who have made a stupendous bungle of public ownership at Seattle.

Superpower, giant power, super-trust and super-service. The press of the nation has taken up the idea first advanced by Secretary Hoover and is twisting and turning it to please the public fancy, with little or no regard to the facts. The interpretation of the term seems to depend upon the particular leanings of the particular editor who is writing the comment. The dangers of the agitation have already been pointed out. For those who feel that the electrical industry is showing needless anxiety, we offer the following from the Seattle, Wash., *Union-Record*, a paper with decided leanings toward labor:

Good people are arguing if a reasonable system for the development of superpower with proper protection for the workers can be worked out, the question of control or ownership will not matter, or at least can be postponed. That seems to us extraordinary reasoning.

It is already certain that superpower requiring the development and distribution of electricity derived from water-power and from coal must be integrated over the country. It must approach a monopolization. The group or groups which control superpower will be the rulers of our life. The conduct of industry and the comfort of homes will be dependent upon those who control this enormous giant which may be either the servant or the master of men. No vast power can safely be entrusted to any monopoly.

The experience of regulation of railroads and public utilities shows how nearly futile is the attempt satisfactorily to regulate monopoly power. Now, before it is too late, is the time to decide whether the people or interests shall control the power of the future. It was this fact that gave significance to the Washington conference called by the Public Ownership league and attended by representatives of various farmers' organizations, labor unions, the League for Industrial Democracy, and friendly congressmen.

Senator Norris has already prepared a tentative draft of a bill for federal control of super-power. Labor unions should get in touch with him in order to procure copies of the bill and to assure him of backing in his fight for the people.

A saner view of the subject is taken by the Portland, Ore., *Oregonian*, which points out some of the fallacies in the arguments of the municipal ownership journals. The following is quoted from a recent editorial in the Portland paper:

Having taken up the cause of public ownership of hydroelectric plants in the State of Washington, the Hearst press is exciting itself and its readers over the terrible menace of a superpower trust. Through interconnection of all power systems we are warned "such a trust would hold America's manufacturing, America's irrigation, America's transportation, America's residential development in the hollow of its hand as Goliath might have held four pebbles from David's sling." The ominous announcement is made that "it already exists in the Northwest" and that "a network has been formed from Oregon to California." "The kings of wealth" are dreaming that "huge private power interests" will "merge into the superpower octopus for perpetual profits, perpetual dominion, a perpetual orgy of superfinance." Then we are informed that "the one thing that can prevent that dream from coming true is public ownership of water and power."

Now the federal power commission, composed of the secretaries of war, agriculture and interior, tells in its annual report what this superpower octopus really is, without any reference to an "octopus" or "kings of wealth." The commission says:

"It (superpower) means that existing generating stations shall be electrically interconnected to a greater degree than now prevails and that . . . new stations when built shall be of large size and high efficiency. It does not mean that all of the power developed can be disposed of when the station is completed. . . . Large-scale interconnection means a less capital investment, a lower operating cost and a greater reliability of service than can be secured with local groupings or with isolated stations."

It is not proposed to combine the power companies into an octopus; each retains its identity and independent existence. The plan is so to connect them that they will do business at lower cost and will render more reliable service. All are subject to public regulation, either by the nation or the states, or both. Their rates are fixed by governmental commissions on the basis of cost, therefore will be lower as cost is reduced. Federal or state commission holds them to continuity of service, to which interconnection of their systems contributes. In case of mishap to any generating station or to the power line leading from it, the current from another station supplies the customers who would otherwise be left without power or light. How is the public hurt by such an arrangement? Is it not rather greatly benefited? How does it suffer by having the several companies work together in serving it rather than work in isolation, one with a surplus forbidden to sell it to another which has a deficiency of electric energy?

A great propaganda for public ownership of power plants is under way in the State of Washington, and those who conduct it fear the effect on public opinion of the efficiency that would be added to private enterprise under public regulation by the superpower plan. The system has been well-nigh perfected on the Pacific Coast, for the federal power commission says that "only four gaps with a total of 25 miles require to be closed in order to have an interconnected system along the Pacific Coast reaching from British Columbia to Mexico, a distance of 1,400 miles."

No single development has done more toward improving public relations than customer ownership. Electric light and power utilities that have adopted this policy enjoy a degree of public confidence that is reflected in their stability in the community. Numerous examples can be pointed out where the public has rallied to the support of a utility in which it was an investor. Commenting on this stability, The Manufacturer says:

Industry is stabilized by eliminating "hazard" for wage earner and investor.

Some big employers are adopting a form of unemployment insurance that "guarantees full pay for not less than forty-eight hours per week in each calendar year," unusual circumstances excepted. Thus is the wage hazard practically eliminated.

The dividend earning power of investments has been stabilized through the plan for consumer and employee ownership of the stocks and bonds of great industrial organizations. With a job insured and with dividends insured, workers and investors in an industry are not good subjects for labor and political agitators.

The customer ownership idea was pioneered in 1914 by the Pacific Gas and Electric Company of San Francisco. Today this company has 29,182 stockholders, 79.6 per cent of whom live in California.

In 1915 the Byllesby Company made 326 sales of preferred stock; 1923 will show some 20,000 sales. During the nine-year period the total number of sales was 78,465, representing 417,506 shares of stock, while 62 per cent of the 5,408 Byllesby employees are shareholders in the company properties.

The Commonwealth Edison Corporation in eleven months of 1923 sold approximately \$5,500,000 preferred to customers

and employees. Since September, 1920, about \$12,000,000 preferred has been sold to 28,000 customers and employees. Alabama Power Company sold over \$5,000,000 preferred stock to customers in the last two years; Consumers Power Company sold over \$5,000,000 to 9,600 Michigan residents. The Public Service Corporation of New Jersey offered 50,000 shares preferred to customers March 1, allotments not to exceed twenty shares, and on first day 18,947 customers subscribed to 75,174 shares. It is estimated that today more than 2,000,000 people own the securities of public utilities of this country.

These examples illustrate how industry is stabilized and real "public ownership" established without burdening taxpayers. Public utilities have always been pioneers.



Extending electric service to the farms

Every farmer who does not now have the benefit of electric service naturally looks forward to the time when he, too, by the turn of a switch, will be able to command for his work the energy of distant waterfalls and electric stations.

Practical difficulties have delayed farm electrification. Even where high-voltage transmission lines have been carried through agricultural sections, the farms are often so widely separated as to make economical electric service impracticable. To build a substation to serve a single farm costs nearly as much as one to supply a hundred farms.

The farmer's problem is to get electric service at a cost low enough to make it profitable for him to use. The utility company's problem is to supply the service at a cost that will enable it to pay a fair return on the money invested.

This joint problem is now being studied by a committee of representatives of the U. S. Department of Agriculture, American Farm Bureau Federation, American Society of Agricultural Engineers and the National Electric Light Association.

TUCSON GAS, ELECTRIC LIGHT AND POWER CO.

A sample of advertising from one of the Arizona newspapers showing what the utilities are doing to build up better public relations.

THIS is one of 20 pumping plants irrigating 1,320 acres under intensive cultivation in Kern County, Calif. It is located on a ranch belonging to Herbert C. Hoover. Three years ago this productive section was pasture land supporting one head of cattle to each five acres. Agricultural development in many sections of the West is dependent upon electric pumping.



How the Power Company Aids Farm Land Settlement

By Al. C. Joy

Advertising Manager, San Joaquin Light & Power Corporation, Fresno, Calif.

IN the development of California two problems must be solved. First of these is to establish permanent prosperity upon our existing farms; second is to bring our raw lands under profitable cultivation.

California is essentially an agricultural state. Mines give of their treasure but once; oil wells start on their way to exhaustion with the first barrel of their yield; the end of our timber forests is even now in sight. The wealth of farm lands is inexhaustible. The civilization building in the Golden West will be great and lasting only as man takes advantage of God's bounteous gifts, and only as he assists and anticipates nature's work by his initiative and ingenuity. Our towns and our cities of tomorrow will be great only as the vision of today becomes reality; and that vision sees every acre of tillable California land green with the fruits of the soil.

California must always pay devotion at the altar of the great trinity of agricultural success—soil, climate, and water. The soil is unsurpassed for fertility. The climate is ideal if one's sole conception of life is merely to live; and the climate, too, gives us a monopoly in many lines of production, if our conception of life is also to work. The raisin growing monopoly of the San Joaquin Valley is after all simply a monopoly of perfect raisin-making climate. Without water, soil and climate are an almost valueless combination. Water can be had only as we ourselves place it upon the land. This has been done, and in this work which has meant the building of the world's richest potential agricultural empire, the power companies have played, are playing, and will continue to play a tremendous part.

The San Joaquin Valley's irrigational development grew from the vision of two men. One of these was M. J. Church, a pioneer of the seventies, who not only saw the possibilities of gravity irrigation in bringing valley lands into intensive cultivation but built the first canal that brought from the foothills to the plains the flood waters of our rivers. The other man is A. G. Wishon of the San Joaquin Light & Power Corporation, who put electric power pumping to work upon those lands which the gravity irrigation systems could not reach.

The first electric pumping in the San Joaquin Valley began more than a quarter of a century ago on the orange lands near Lindsay. Here all irrigating was done by pumping with gas engines. Wishon built a power line. He talked power pumping to the

CALIFORNIA is faced with the problem of bringing under cultivation its millions of untilled acres. The power companies, by furnishing power for irrigation, have done much to further this development. Now they are undertaking the task of bringing new settlers into the states.

growers. They were skeptical. They had to be shown, and they would not invest a penny in power installation until they were shown. Wishon borrowed money to buy equipment for farm pumps. He put on a demonstration and then sold the power plants to the growers on easy payments. From that beginning with twenty-five installations power pumping in California has progressed until today the San Joaquin Light & Power Corporation is irrigating more than 400,000 acres of land, with nearly 6,000 farm pumping installations. The Southern California Edison Company with more than 9,000 pumping consumers is irrigating 700,000 acres. The Pacific Gas and Electric Company is irrigating 600,000 acres. The Great Western Power Company is irrigating 190,000 acres, the Southern Sierras more than 66,000 acres. Approximately 200,000 acres are irrigated by other California power organizations. There are millions of additional California acres, just as fertile, that may be brought to profitable cultivation by electric pumping. The power companies stand ready to place power upon these lands.

This is only one factor of the power companies' aid to farm land settlement. It is not enough that the California farmer should have merely soil, water, and climate to guarantee his success. He must have the additional incentive of a happy and contented home life, and this he can have because electricity makes possible city conveniences, comforts, and labor-saving devices in any country home. Thousands of California farm homes are electrically lighted. Many are electrically heated, many equipped with electric ranges for cooking, electric refrigerators, electric appliances of every character. The farmer's wife is freed of household drudgery by electrical servants. The farmer himself is no longer a slave to back-breaking labor. Dairies are operated with electric milking machines; separators, churns, feed grinders, and other small machinery are electrically operated. Poultry farms are equipped with electric incubators and brooders, and even the hen herself has her electric light to lengthen her day and increase her egg production.

Let me, however, emphasize that the power company is not working so much for the development of a great farm power load for its own benefit as for a great general development for the benefit of all California. Ninety-nine per cent of the power companies of America have no farm load whatever. We of the

California power companies may in all modesty therefore boast of our accomplishments in this direction and take unto ourselves some credit for the rapid growth of agricultural California in recent years. Not only have we brought new lands into settlement, but we have made farm life itself attractive.

We have contributed indirectly, too, in tremendous measure to farm upbuilding and prosperity. Millions of dollars of California's annual income is derived from perishable products. These must be shipped in refrigerator cars. The great ice plants necessary in this refrigeration are electrically operated. The creameries, packing houses, canneries, byproduct factories, cotton gins, oil mills, flour mills, and scores of other industries without which farming could not be profitably pursued in California are today numbered among electricity's contributions to agricultural success.

The farm pumping load is a big load, but it is from our point of view a factor of development, not development itself. If the power companies were compelled to depend upon it alone they could not exist. It is seasonal; its demand is for a few weeks only. During the balance of the year power plants would necessarily remain idle if there were no other power uses. But the development of agricultural California means the development of an industrial California. It means bigger towns, better towns, more manufacturing, more demand for a steady use of power that will keep the wheels of our generators turning and thus give us the evenly balanced diversified demand necessary to economical and efficient operation. Frankly, we are thinking in terms of self-interest, and self-interest should always be consid-

ered not on the basis of how it may be advantageously served now, but how it may be served to the greatest ultimate advantage. Self-interest should not be confused with selfishness. We are not selfish. We know that as California develops, as industry assumes greater proportions, a share of all prosperity will be ours. That, of course, is what we are after. But every other business institution and every other individual will benefit as well.

At the beginning of 1919, immediately after the close of the war, the San Joaquin Light & Power Corporation found itself with 2,000 applications for power service, of which 1,200 were for farms. The power industry had been unable to keep up with the demand. In this respect it was no different from any other industry. The nation demanded men and materials, and industry patriotically marked time. But with the war over we wanted to meet that demand. We needed power houses, transmission lines, men to do the work; we required a big construction and financing program. To get the materials it was even then necessary to show to the government that we were entitled to priorities. First of all we sought to establish that power service is a basic industry. Granting that agriculture is the real basic industry, agriculture in the San Joaquin Valley depended very largely upon electric power. Therefore even as agriculture itself is basic, electric power service is basic.

Analyzing the 1,200 applications for agricultural service we discovered that 600 of them were for the development of new farm lands, requiring new homes, barns, buildings, fences, and all farm equipment. Analyzing still further we found that in Fresno County there have always been approximately two homes in the town for every home in the



This land of the Associated Vineyard Company, formerly devoted to grazing, has been made productive by the application of water pumped electrically.

country, and we have found since then that this is the ratio in practically every farming community of our state. It was apparent then that when we had rendered service to the 600 new farms we would be called upon to render service to 1,200 new homes in the cities and towns. Our business therefore would benefit by 1,800 new services. But it is not our business alone that benefits. The realtors have perhaps figured in that same period in 1,800 deals. The cost of the average in-town home in this locality including the building site, is \$6,000, and for the country home, without the building site, \$5,070, or a total building construction program of \$10,242,000. In such a building program every dealer in materials, every trade worker shares; every merchant gets additional business through the population increase. There must be a certain amount of commercial construction, new stores, new factories necessary to handle the product of the 600 farms and to supply the wants of the increased population. Here again there is business for all in the community, and once again the individual welfare of each of us is benefited.

This is cited to show that the power companies in aiding farm land settlement are aiding, too, in the development of towns and cities. They are not confining their activities to power extensions or installations. They are trying to aid right now in the solution of the two problems confronting us in state development.

California has the lands; California needs the settlers. But it would be a mistake indeed to bring settlers to our lands without working out first a balanced plan to guarantee that they will be assets rather than liabilities. Many of our farmers, particularly in the San Joaquin Valley, are not prosperous today. The reason for this is that they have largely quit farming to become specialists in one crop production. The man with one crop faces constantly the danger of adverse weather conditions, overproduction, pest visitations, business depression. One bad year may set him on the red ink side of the ledger, and he suffers the next year, no matter how much conditions are changed for the better, through the necessity of paying off the deficit.

I have said that the power companies to operate successfully must have a balanced load so that their generators will be in full operation the year round. This balanced load depends upon diversity in the use of power. Farmers should take a leaf from the power company book and introduce diversity into their operations.

Through our field men, our district managers, our executives, and all members of our organization having contacts with the farmers, we are preaching diversity of production as the one means of stabilizing the prosperity of our agricultural communities.

The problem of settling our raw lands is still to be solved. California wants the small farmer who is practical. We can show him the possibilities of diversified farming, but we must also be able to show him some one crop that gives promise of his biggest and most profitable return. At this particular moment my company is seeking to tell the world that the great agricultural opportunity in the San

Joaquin Valley is in the growing of cotton. Out of the disastrous experiences in growing cotton in the Southwest three or four years ago valuable lessons have been learned. By those lessons we are guiding our present cotton growing activities in the San Joaquin Valley. We know the kind of cotton to grow. We know the importance of getting the best seed. We have learned how to plant it, how to care for it, how to irrigate it. The San Joaquin Valley produces as fine quality of cotton as is grown anywhere in the world. It produces prolifically also, the average yield being in excess of one bale to the acre.

It is declared by certain economists, who have apparently overlooked the possibilities of cotton growing here in the West, that America not only must cease exporting but will soon be under the necessity of importing from Egypt and India to take care of our own requirements. The price of cotton is up, and there is every indication that it will remain up for several seasons. In California we can produce quality and quantity. We can irrigate when we please; we are free from the boll weevil, which apparently does not exist in a dry climate such as ours; and we have millions of acres of adaptable raw land waiting for cultivation. The world's cotton production averages from 21,000,000 to 22,000,000 bales. A half million bales one way or the other would not materially affect the total; but 500,000 additional San Joaquin Valley acres planted to cotton, and thus brought into profitable production, would mean a tremendous increase in population, in industry, in prosperity, in development. The power companies are ready to irrigate this cotton, to give the cotton grower the electrical home in the country, to furnish power for gins, and for factories that in fabricating his product will provide him a home market.

Again you will say, how does this apply to my subject? It applies to the extent that once more thinking in terms of general Valley growth rather than in terms of electric power, the power company is urging the planting of cotton. We have gathered statistics which we are placing in the hands of every interested person. We have inserted advertisements in twenty-eight leading newspapers of the Southern states, stating that practical men with enough capital to start can make money growing cotton in the San Joaquin Valley. We have asked in this advertisement that those interested should communicate for further particulars with us or with the secretaries of the Chambers of Commerce in various Valley towns. The response has been remarkable; inquiries already reach into the hundreds. To inquirers we are merely telling the general story. We are not selling land, nor are we recommending to them any particular tract or particular locality. We are pointing out the particular attractions we have to offer and the availability of good land at prices ranging from \$75 to \$150 per acre.

The power companies of California are interested in farm land settlement. They are doing their share to aid in rural development. They will always be found ready and willing to cooperate in any constructive program for the good of the state as a whole.

The Electrical Jobber's Stores Department

By P. W. Todt

Stores Manager, Western Electric Company, San Francisco

IN considering the problem of the electrical jobber's stores organization, it would first be fitting to review briefly the reasons for the existence of the electrical jobber. His fundamental function is the filling of an economic need in distribution from the manufacturer to the retailer and user. In performing this service he accumulates a variety of articles and places them in the hands of the trade much more economically than can the individual manufacturer. Therefore, he reduces expenses and helps solve the problem of the manufacturers to find outlets for their material, thus permitting them to concentrate on production.

The middleman will continue to exist just so long as he fills an economic position in the business world; but should his cost of marketing increase so that it would equal or exceed what it would cost the individual manufacturer to distribute his products or if the system of distributing through the jobber causes unnecessary expenses to be added to the cost of merchandise, then he is no longer serving a need, and will be discarded.

It is therefore the jobber's duty, not only from a business standpoint but also for his own self-preservation, to eliminate all unnecessary expense from the cost of operation and to guard against propaganda for his elimination. It is well known that at the present time there is considerable discussion on this subject, but the jobber's position can be maintained if he continues to fill his economic need without placing too great a burden on the cost of distribution.

Service is the biggest problem of the stores organization. Service in the broad sense of the word covers the entire operations of the jobber; but when it refers to the stores department it means the prompt and efficient handling of a customer's order from the time it is received until the goods are finally received, accepted, and paid for by the customer.

Here on the Pacific Coast the stores department is considered to be of as much importance as the sales department. The stores organization of today requires at least as much expense as the sales department, which condition was not true a few years ago. In fact, if it continues during the next five years at the same ratio as it has during the past five, it will be considerably more expensive to operate than the sales. This is one indication of the increase in the demand for service.

The problem that confronts the stores depart-

THIRTY-FOUR cents of each gross-profit dollar taken in by the jobber goes for the support of this important phase of his organization. With extraordinary service being used more and more as a means of soliciting business, the tax on the stores department is increasing. Only with the closest cooperation between the jobber and his trade can this problem be solved.

ment is the setting of a standard of service that will be satisfactory to both the customer and the jobber. Just now we have no such standard; in fact, we are proceeding actually beyond the limits of economy and necessity, which condition, if continued, will leave nothing for the jobber as compensation for services rendered.

Six years ago, it was considered good business policy to spend 25 cents in stores work for every dollar gross profit received. Today, many jobbers are spending 34 cents out of every such dollar, and yet there has been but a slight increase in sales operating ratio and little or no increase in financial and administration ratio.

It will be noted from this that the stores department of today is taking a toll of an additional nine cents out of every dollar of gross profit, or an increase of about 36 per cent over the same expense of six years ago, and this in spite of the fact that there has been a decrease in the gross profit rate. The result is that net profits are gradually vanishing.

Extraordinary service is today being used more and more as means of soliciting business until it is gradually becoming as dangerous as cut-throat price competition. I do not believe that the customer is entirely to blame for this condition, for I think that a certain amount of the responsibility rests on the jobbers and their salesmen. Salesmen have a tendency to go out and lead customers to feel that regardless of how unreasonable their demands are or what the cost may be, the jobber can fulfill them. It can easily be seen that this is not only expensive to the jobber but also harmful to the dealer and contractor. It leads the customer to become lax in properly maintaining his stocks, because he knows that if he runs short of an item, he can telephone or telegraph such an order and request that it be shipped at once. Orders of this class are usually placed in a hurry, and little consideration is given to the quantity, resulting often in a loss to the dealer because he has not checked his quantity discounts. Nor has he inventoried his stock and tomorrow he may find another item short, which means a second rush order, with two handlings by the jobber where one would have sufficed, and two freight and cartage charges for the customer when both items would have cost him no more for freight and cartage than the one.

Another bad effect is the tendency to become careless in watching his entire stock. Such a dealer

or contractor is interested only in his shorts, and neglects the bulk of his stock and his frozen merchandise, which, if thawed out, would furnish funds which could be used to advantage in his business.

It has been my experience that the dealer and contractor who has few demands for special service is the one who follows a systematic method of ordering, and who anticipates his requirements sufficiently in advance to avoid rush shipments. When placing an order, he checks his entire stock, thereby eliminating numerous orders, and not only saving needless expense for the jobber but also for himself. His material arrives in one shipment, with but one shipment to check and warehouse, and one invoice to check and pay, in place of a number of small ones.

The sales organizations are continually emphasizing new ideas to our customers and new methods of selling merchandise and the credit departments are spending considerable time in instructing them in proper financial and collection methods, but very little educational work, if any, is being done to help the contractors and dealers in one of the most important jobs—that of properly maintaining stocks of merchandise. The difficulty of giving service will be lessened when the dealers and contractors are educated to realize their responsibilities in maintaining stocks in such a way that they are in a position to give the proper service to their customers and not pass the entire burden on to the jobber.

I have in mind a dealer who follows a definite plan for stock ordering and who regularly, on the twenty-fifth of each month, sends in an order of from 50 to 75 items to be shipped on the first of the month. It is plain from the variety of the items appearing on his order that he has carefully checked his stock. When his requisition is received there is sufficient time to assemble and pack it, to locate and pick up shorts and non-stock items, and to make one complete shipment; and therefore he has to place few orders during the month, except for very special material.

I know another customer who is just the reverse. On one day we have received as many as three telegrams requesting express shipments of such staple lines as rubber covered wire, sockets, and lamp cord. It is not difficult to decide which of these two accounts is the real merchant who is making a profit from the business.

The dealer or contractor who demands extra

service not only suffers losses within his own business, but creates needless expense for the jobber, who must compensate his own increased expense by higher prices to the trade. I sincerely believe that most customers do not realize that the expense for extraordinary service runs to a considerable amount. If it were brought forcibly to their attention as well as to the notice of the salesmen, so that they were shown that the discontinuance of this class of service is a saving to them as well as to the jobber, and if the salesmen would stress more the necessity of the dealer or contractor doing a real merchandising job, and less on their firm's willingness or ability to ship an order immediately, we would not be facing the dangers which threaten the electrical jobbing business today.

I do not want to leave the impression that the jobber should not be in a position to give immediate service on emergency orders; but the requirements should be confined to real emergencies that have been caused by conditions that could not be anticipated.

Another important problem of the stores department is material returned for credit, which return is usually caused through no fault of the jobber. The general practice of allowing indiscriminate returning of material places considerable additional expense on the jobber as well as on the customer, and is due to the lack of sys-

RESPONSIBILITIES OF SALES DEPARTMENT IN CONNECTION WITH SERVICE

1. Develop within the organization the thought of selling only that which is regularly carried.
2. Where possible, direct orders for specialties and parts not carried by the house to the concern which regularly carries them.
3. Discourage "Special" and "Rush" orders.
4. Strive to increase the size of order and particularly to order in cartons and standard package quantities or multiples.
5. Endeavor to get the order complete as to the various items and material necessary for handling the work to be performed.
6. Educate customers to order stocks systematically and anticipate their demands, thereby eliminating "Rush Orders" and lessening the "Return Goods" evil.
7. See that orders sent to your house are properly written and that all information is complete as to the description of material and other instructions necessary to the correct handling of the orders.

tematic ordering. It certainly piles up expenses very rapidly. The customer must pay the expense of freight, the cartage from the freight sheds to his store, the unpacking and checking of the material and the bills for it, and also the paying of the invoices on the incoming shipment; and on top of all this, he has the same expense, plus some additional outlay, for the return of the material.

The jobber has incurred the expense of handling the order through the clerical and warehouse departments, and has paid for the cartage to the freight sheds on the outgoing shipments. On the return shipment, there is the expense of handling, which includes cartage from the depot to the warehouse, the checking of the material, the inspecting and placing it in condition for resale, the clerical work of issuing the credit and of placing it on the books. The cost of handling one of these transactions is usually more than double the cost of making a similar shipment that is not returned.

The regrettable part is that no one is benefited by all this work and no profit for the service rendered

has accrued either to the customer or the jobber. To reimburse this loss in handling it requires over double an amount of new sales; in fact, it can be said that the loss is never really recovered, because the orders that follow may never have been influenced by the return shipment.

From the angle of stock consideration, also, this problem has its evil. When an order is filled, it naturally follows that the jobbers must replace the shipment and order replenishing stocks from the manufacturer. When the return shipment is received it often means an excess of requirements, thus increasing the investment and carrying charges.

The handling of such items as returned washing machines, ranges and other large appliances is exceptionally expensive. In many instances they require unpacking, testing, and recrating; and they are often received in such a scratched or marred condition that they must eventually be sold as second-hand material.

Items that have been made up for a special order or brought specially from the factory are causes for heavy losses when they are returned. Every jobber has some corner in the warehouse known as the "junk room" or special stock room, which contains merchandise amounting to thousands of dollars for which there is no regular demand, and which must usually be sold for junk.

All these losses must be considered as part of the expense of the business and must be compensated for, so that the natural and inevitable result is the adjusting of the prices to the trade to meet these expenses. We will always have the problem of returned material to contend with; for even the best-managed concern does not find it possible to gage stocks so that slow-moving or overstock items are entirely eliminated. However, I believe that the greater part of the returned goods evil can be eliminated by giving more thought to ordering. Again we find the necessity, as in the case of the service problem, of educating the trade to become better merchandisers and to give more care to their ordering. By doing this, the dealer or contractor can plug up one of the biggest profit leaks in his business.

The jobber's salesmen can also play an important part by carefully studying the customer's requirements and refraining from selling articles for which there is little chance of the customer selling or for which there is no demand in that territory. The days of high-pressure peddling have passed and the successful salesman who builds for a solid and lasting business is the one who studies and knows the requirements of his customers and territory, and applies his sales efforts accordingly.

In discussing these problems I have endeavored to look at them from all angles, always having in mind a closer cooperation between the jobber and the trade that will considerably reduce these unnecessary expenses and reflect a benefit to the industry as a whole and to the ultimate consumer. If the compensation demanded in distributing merchandise is not in keeping with the services rendered, then the system will fail, for after all, the final judge is the consumer.

Telephone Recognized as Factor in Public Relations

A telephone conversation furnishes a means of contact with the public that may be used either to improve public relations or to injure them. With this thought in mind The California Oregon Power Company has devised a plaque to be attached to the mouthpiece of every telephone on its system as a constant reminder of the necessity for care in speaking over the telephone. A reproduction of the plaque is printed herewith.

The plaque is a reproduction of the company's symbol, the keystone. It is made from plated sheet brass, the wording being etched on the plate. The background is blue enamel. The brass, of which the plaque is made, in addition to presenting an attractive appearance, eliminates the chances of the emblem being destroyed by thoughtless persons.



Plaque to be placed on mouthpiece of telephones on The California Oregon Power Company's system.

The idea originated during a conference of members of the organization last October. At that time an invitation was extended to those present to suggest suitable wording for the plaque. The "prize" was won by W. H. Crawford, manager of the new industries department of the company.

The California Oregon Power Company is taking an active part in the "Smiles Campaign" of the Pacific Coast Electrical Association. The idea of the telephone plaque, however, was devised before the "Smiles Club" was announced. It ties in excellently with the general campaign for courteous service that is being staged in California at the present time.

Staging a Successful Illumination Sales Campaign

By H. H. Allison

Illumination Engineer, Pacific Gas and Electric Company, San Francisco

COOPERATION has become the watchword of the electrical industry. Permanent cooperative agencies—local, state-wide and national—have been set up within its ranks for the purpose of solving some of its most pressing problems. So successful have these been that periodic sales campaigns in which central station, manufacturers, jobbers and contractor-retailers have united for mutual benefit, are being developed to cover particular phases of the business. The results of one such campaign are described in the following article.

During the fall of 1923 the sales department of the Pacific Gas and Electric Company conceived the plan of staging a campaign with the cooperation of jobbers and contractor-dealers in San Francisco for the purpose of selling better show window and interior illumination to the merchants of that city. The central station was actuated by the desire to increase its connected load; the jobber to sell more equipment and the contractor-dealer to derive the profit incident to the installation of the equipment. The plan as evolved was that the power company should manage the campaign and furnish five salesmen each of

whom would represent one jobber. The jobber was to assist in the training of the salesmen, furnish literature and sample equipment. The contractor-dealer was to estimate the jobs and install the equipment which the salesmen sold. Those cooperating in the campaign consisted of the power company, five jobbers and eighteen contractor-dealers.

How well the campaign succeeded is shown by the following:

Number of stores surveyed.....	2,404
Number called upon and given talks on better lighting.....	1,367
Number sold better lighting equipment.....	268

Expressed in dollars and cents the results accomplished were:

Total amount of fixtures sold	\$12,669.31
Total amount of wiring sold	8,220.24
Total amount of lamps sold	2,776.99
Total merchandise sold	23,666.54
Additional connected load gained.....	274,095 watts
Estimated monthly revenue (conservative).....	\$1,745.95

The campaign was scheduled to operate for a period of twelve weeks with two weeks given over to training the salesmen, one week of actual school



The salesmen were instructed in an improvised class room equipped with all classes of lighting units.

work and the second of practical application in the field. The general plan of procedure outlined follows:

1. Selection of five experts from lighting industry to act as advisory board in training salesmen and giving them technical information when required.
2. Survey of the smaller retail stores in San Francisco and the listing of 1,500 actual prospects served by the power company having poor show window or interior illumination.
3. Employment of five salesmen who would be suitable for selling better illumination.
4. Establishment of a school and outlining of a course of study on illumination which would be sufficient to enable them to sell better lighting methods and proper equipment.
5. Printing two series of sales letters, 1,500 of each, which were addressed to the prospects over the power company's name.
6. Printing 1,500 prospect forms to be given to the salesmen with the prospect listed.
7. Dividing the city into business districts for the purpose of systematic work by the salesmen.
8. Devising a systematic method of directing the salesmen's activities and keeping a record of prospects and follow-ups.

The advisory board selected consisted of the following: illumination engineer of National Lamp Works, illumination engineer of Edison Lamp Works, representative of Westinghouse Electric & Manufacturing Company, representative of National X-Ray Company, and representative of the Pacific Gas and Electric Company.

The survey of the stores to secure a list of 1,500 prospects was no small task. In a period of two weeks over 3,000 stores were visited by two men. The natural shopping centers facilitated the creation of districts and considerably lightened the task of keeping records and handling the salesmen. It is estimated that 95 per cent of the stores in the city were covered by the survey.

A sample of the survey card, which showed the firm, the address, and the class of business is reproduced herewith. The salesman, upon visiting the store, would fill in the remaining data and, if the prospect was good, would make a sketch of the store interior and windows on the reverse side.

Considerable discretion was used in choosing the salesmen. Candidates were first interviewed by the personnel department of the power company and the eligibles were then turned over to the sales department for further questioning. They were passed upon by four individuals before being employed.

The records of the five men finally employed are interesting. Salesman A had a varied sales experience but practically no knowledge of electricity; B and C were recent university graduates in electrical engineering; D was a former power salesman; and E had some technical training and some illumination experience. The results of the efforts of these men follow:

Salesman	No. of Prospects	No. of Sales	Mdse. Sold
B	275	85	\$7,172.95
E	267	59	5,517.83
D	275	55	5,010.70
C	275	37	4,470.25
A	275	32	1,494.81

Salesmen were assigned by lot to represent the manufacturer's lines as handled by the jobber.

Great care was exercised in the training of the salesmen. Suitable quarters were secured from the

power company. A room was equipped with desks, a drawing board and a blackboard. Typical specimens of interior and show window lighting equipment were hung in the room. In this manner it was possible for the prospective salesmen to visualize the present correct lighting practice. The training itself consisted of one week of lectures and demonstrations and one week of practical application. The various manufacturers furnished bulletins which were used as text books and lighting experts delivered lectures. While the training was intensive to a marked degree, the results achieved demonstrated that it was highly effective.

Following the lectures, the salesmen were sent into the residential districts for a week to try their sales arguments on small grocery stores and markets where it was felt that they would meet with the greatest sales resistance. After this they were sent into the busier districts.

The procedure of the salesmen as set down by the advisory board follows:

1. Secure name of prospect and list on form.
2. Write two strong sales letters to prospect in week preceding salesman's visit.
3. Visit five prospects per day in addition to follow-ups.
4. Interview manager of store (the salesman represented himself as power company lighting expert).
5. Survey of store lighting equipment and recording information on blank. If considered good prospect sketch is made of store and date of next call noted.
6. Design proper light system and secure bid from one of cooperating contractor-dealers.

NO. _____ DATE _____ SALESMAN _____ DISTRICT _____

FIRM _____

STREET _____ NO. _____

KIND OF STORE _____

CLASS 1 _____ 2 _____ 3 _____

SEE MR. _____

INTERIOR

WINDOW

☐ BARE LAMPS

☐ OLD FIXTURES

☐ INSUFFICIENT ILLUMINATION

☐ WRONG TYPE ILLUMINATION

☐ BARE LAMPS

☐ OLD FIXTURES

☐ INSUFFICIENT ILLUMINATION

☐ WRONG TYPE FIXTURES

No. FIXTURES _____ F. C. INTENSITY _____

No. FIXTURES _____ F. C. INTENSITY _____

PARTY INTERESTED IN ILLUMINATION— WINDOW _____ STORE _____

RETURN LATER _____

NOT INTERESTED _____

REASON GIVEN _____

REMARKS: _____

MAKE SKETCH ON REVERSE SIDE

Reproduction of the survey card used by the salesmen who called upon the prospects. The reverse side of the card was used for making a sketch of the store interior.

PERIOD FURNITURE DISPLAY

517-19 SUTTER STREET

SAN FRANCISCO, CALIFORNIA

TELEPHONE SUTTER 6446

October, 29, 1923.

Pacific Gas & Electric Co.
San Francisco Division

CHIEF M. CLAUSEN, PRESIDENT
S. M. HERRICK, VICE-PRESIDENT
BRUCE L. SMITH, SECOND VICE-PRESIDENT

Clement Street Merchants Association

MEETING ROOM AND SECRETARY'S OFFICE

308 FIFTH AVENUE

SAN FRANCISCO

S. M. HERRICK, SECRETARY
W. C. PETER, TREASURER

U.S.

CABLE ADDRESS: NEWIDGIVE

GENERAL OFFICES: NEW YORK CITY

BRANCHES: BALTIMORE, MD.

BRANCHES: BALTIMORE, MD.

BRANCHES: BALTIMORE, MD.

BRANCHES: BALTIMORE, MD.



Sanborn, Vail & Co.

STATIONERY, ENGRAVING, PICTURES

FRAMES AND ARTISTS' MATERIALS

557-563 MARKET STREET

SAN FRANCISCO

Pacific Gas and Electric
445 Sutter St., Calif.
San Francisco, Calif.

Gentlemen:

Last month
service of your lighting
with my show window illu-
called on me and advised
to install certain fixt-
closely and -

HAROLD HERSCH

Dry Goods & Men's Furnishings

5455 GEARY STREET

PACIFIC 9322

SAN FRANCISCO NOV. 19, 1923.

Illumination Department.
The Pacific Gas & Electric Co.,
445 Sutter Street, City.

Gentlemen:

Upon advice of your Mr. Hancock, we changed the lighting
system in our store, doubling our lighting inside and replacing drop
window lights with X-Ray reflectors and the result has been entirely
satisfactory and well worth the expense incurred.

Merchandise which previous to the change in window lights
looked dead and insipid now seems to stand right up and it seems that
hardly a person passes the store in the evening without looking at
the goods in our windows.

We are well pleased with your help in this connection and
particularly do we appreciate the service rendered by your Mr. Hancock.

Very truly yours,

Harold Hersch

SUNSET HARDWARE CO.
BARBERS, PAINTS, HOUSEHOLD GOODS, FURNISHING
GENERAL REPAIRING-PAINTING
1913-1917 NINTH AVE.
SAN FRANCISCO, CAL.

Pacific Gas & Electric Co.,
445 Sutter St.,
San Francisco, Cal.

Gentlemen: Attention: Mr. A.

Replying to your inquiry
the results of my new elect-
system as laid out by you -
only greatly improved the a-
the store but has made sale
through better showing of

Our Saturday night bu-
been noticeably better than

Yours

SUNSET

By

Sharp & Dohme
1100 King Street
Mission Street
San Francisco, Cal.
Dec. 17, 1923.
ric Company.

AVEZZARI
518 SUTTER STREET
Nov. 7, 1923.
Gas & Electric Co.,
Sutter Street,
Piseco, Cal.

Attention: Mr. C. A. Russell
In reply to your inquiry con-
e effect of the color lighting
recommended for our show win-
dow, we state that our sales have
increased. These light have proved
we in attracting prospective
our store.

Yours very truly,

S. D. King
53 Sutter St.

Many letters, stating the customer's satisfaction with the installations made, were received by the men in charge of the campaign. The above samples give an idea of the diversified character of the concerns that were sold better illumination.

7. Present design and bid and help contractor-dealer close sale.
8. Render a complete report each week of all prospects interviewed and amount of merchandise sold.

The preparation and mailing of the letters was done systematically. Each letter was sent out over the signature of the power company's district manager. Letter No. 1, which was mailed on Monday, follows:

Dear Sir:

Would you occupy a store which had no windows? No, of course not!

You pay a higher rent because of the use of a window. Are you receiving full value for it?

Many windows are valued at one hundred dollars per hour. What are yours worth?

They can be made to earn more dollars every hour by effective lighting methods. One California firm reduced their advertising costs by 50 per cent due to increased drawing

power of highly lighted windows. Another firm interested 22 per cent more people in their windows by an expenditure of 8c. more per hour for electricity.

A well lighted store window is never forgotten.

Few merchants realize that the only means a customer has of forming an opinion of merchandise is by LOOKING at it. Therefore, the most important item of a store should be the illumination by which the customer sees the article desired.

The lighting of any store or window may be modern and profit-making by equipping it with lamps and reflectors, designed to flood the display with a soft, warm light which will bring out the quality and color. In many cases, no additional wiring is necessary.

Have you given consideration to the small cost involved in converting your present store and window lighting to a new and up-to-date installation, which will bring ten-fold return in sales?

Letter No. 2 was mailed on Thursday. Its text follows:

Dear Sir:

How many people does your window stop?

The purpose of a store window is to attract the attention of a shopper. Increased light in your windows will induce 50 per cent more people to look at your display. The more people your window stops the greater will be your sales. Attractive display windows will draw the prospective buyer into your store.

The well-lighted INTERIOR will show the true value of your merchandise. Better store lighting will pay you a real profit. People like to trade in bright, cheerful stores and just naturally flock to them. One store recently increased its sales in actual dollars and cents 29 per cent per customer, by no other means than Better Lighting.

Is your store the one out of every three which does not have adequate illumination? Do you know how much light reaches the article you wish the customer to examine? If it is necessary for your customer to turn goods first one way and then another in order to see them, your wares are being hidden by insufficient light and the results you so earnestly desire cannot be expected.

In nine out of ten stores, either the dimness or the glare from a few light sources causes a fine new stock to look like last year's left-overs. Merchants then wonder why so many people pass out of the store without purchasing, and exchange so many of the articles they do purchase. Why not investigate the cause and get the cure—Correct Lighting.

By the expenditure for electricity of an additional small fraction of one per cent of your present operating expense, you can increase your gross sales from 5 to 25 per cent. Will you let us show you how?

The Pacific Gas & Electric Company feels that it is rendering you a real service by calling to your attention these profit-making items. Our lighting specialist will call on you next week, for the purpose of making a survey of your store lighting, and recommending to you the proper design and equipment for your installation.

These letters were found very effective and made the salesman's approach comparatively easy. In one instance a customer called the power company and asked the salesmen to be sent immediately in-

stead of the following week as stated in the letter. Another telephoned that he desired the services of the lighting expert as soon as possible because he had watched his windows and found that they "didn't stop anybody."

Frequently consumers offered suggestions or complaints regarding service or bills. Such names were listed on a special form and turned over to the proper department in the evening.

At the end of each week a progress report was made to those who were cooperating in the campaign. The power company's illuminating sales engineer checked the status of each active prospect. If any had been given up by the salesman, they were listed on a special form and later called upon by the sales engineer. Several sales were made in this fashion.

Frequently customers requested that their own contractor be allowed to make the installation after a job had been sold. While this prevented the co-operative contractors from getting the business, it merely resulted in more dealers being benefited. The goods were sold in any event.

In checking up the stores after new show window or interior installations had been made, it was found that in every case owners or managers were highly enthusiastic over the results. Many letters were received commenting on the installations, some of which are reproduced herewith.

In general, the campaign is regarded as a distinct success. Not only has it paved the way for future sales but it has definitely shown the contractor-dealer that business is at hand if he will go after it. Moreover, it has demonstrated the power of united effort in attaining increased sales.

Results Tell the 1923 Story for the Cooperative Campaign

THE proof of the pudding is in the eating and the test of any cooperative movement is in the results that can definitely be attributed to the movement. The activities in themselves are of no particular value and are not of primary interest to the constituents supplying the funds for the maintenance of the cooperative bureau. Results accomplished are the vital factors.

During the past year the California Electrical Cooperative Campaign has been active and in addition to this the activities have brought results that have meant dollars and cents to the entire electrical industry in California. Work has been carried on in the domestic and commercial fields and along merchandising lines, surprising success having been achieved during the year.

In answer to any question that might be raised as to the practical results of the work done in the domestic field a survey has been made of hundreds of homes under construction to determine just what items enter into the average electrical installation

today. In order that a fair appreciation may be had of the steady progress being made in standards of electrical wiring, Table I gives first the figures obtained in the 1923 survey and second those obtained in a similar survey during 1922.

Year	Lighting Outlets		Switch Outlets		Convenience Outlets	
	Average per home	per room	Average per home	per room	Average per home	per room
1923—	22.9	3.98	16.47	2.86	8.84	1.53
1922—	20.9	3.84	10.96	2.01	6.39	1.18
Gain	2.0	.14	5.51	.85	2.45	.35

Campaign representatives were called upon by architects for assistance with wiring specifications on fifty-one jobs, twelve of which they laid out in their entirety, acting in an advisory capacity upon the other thirty-nine. One of the jobs laid out was a seven-story nurses' dormitory of 150 rooms; another was a summer resort amusement pavilion. The specifications on these two installations called for 125 convenience outlets in addition to the many lighting

and switch outlets. A third job that was laid out was a private home which was wired in accordance with the Campaign's recommendations for 15 kw. for air heating, 5 kw. for water heating, 7 kw. for electric cooking, 3 convenience outlet circuits and 2 lighting circuits. Still another job laid out was a store building on which the Campaign increased the electrical specifications 50 per cent and after explaining to the architect secured his full approval.

A survey of nineteen apartment houses showed a total of 1,124 rooms, 3,428 lighting outlets, 2,421 switch outlets, and 1,425 convenience outlets. Five other apartments surveyed also showed better than one convenience outlet per room; and still another three-story, twenty-seven-room apartment house with 65 convenience outlets had one or more in every room. One apartment house inspected is a thirteen-story building with 130 apartments, each of which is completely electrically equipped with range, water heater, dish washer, clothes washer and ironing machine. There is also a large electric range in the service kitchen.

The rapid spread of the electrical cooking idea is manifested by six apartment houses under construction in one California city. These will be equipped with electric ranges numbering from 36 in the smallest to 130 in the largest building. Four of these apartment buildings will also have electric water heaters in each apartment.

One building concern which a year ago was putting up apartment houses with one convenience outlet in each three-room apartment is now putting an average of two convenience outlets in each room of every three-room apartment, and they state that they feel the Campaign gave them some very valuable information in calling to their attention the advantages the convenience outlet has to offer.

To secure these results the California Electrical Cooperative Campaign has been following out a well defined policy. It is agreed by everyone in the electrical industry that if a proper number of circuits is provided to amply take care of an adequate supply of outlets, the home-owner will be in a better position to make ready use of electrical appliances. Consequently the logical place to start, in any campaign to increase the use of electricity in domestic life, is with the wiring plans and specifications. To improve standards of wiring, the plan has been to show the importance and value of the outlets—the only visible source of electric power.

The least understood, least appreciated, least utilized outlet—the convenience outlet—was selected as the medium to convey the message to the public. At the time that this work was first undertaken the average number of convenience outlets being installed in new homes was less than one per home. During the course of this effort this figure has grown steadily more favorable until today an average of over one and one-half convenience outlets per room is being installed in new homes.

One of the principal activities that has aided in increasing the number of convenience outlets that is being placed in new homes has been the displaying of electric homes in various parts of the state.

Five electric homes displayed under the care of a Campaign representative and corps of demonstrators were opened for public inspection during 1923. A total of 78,916 persons visited the five homes while they were open.

The homes exhibited, together with their period of display, and attendance were:

Long Beach—Feb. 22 to March 7—13,778 visitors
 Fresno—April 12 to April 29—13,387 visitors
 San Francisco—May 3 to May 20—15,500 visitors
 San Diego—May 17 to June 3—29,025 visitors
 Sacramento—June 1 to June 10—7,226 visitors

The first 1924 electric home was displayed in San Jose. The second home that the Campaign is sponsoring, this year, is one located in Hollywood. Publicity for this display started with the groundbreaking ceremonies and every step taken, in the construction of the home, has been marked by some event that has been told to the public through the daily press. The electric home has been wired for a connected load of 57 kw.

The work of educating the public as to the proper methods to be followed in electrifying the home has not been confined to the displaying of model homes. Constructive effort has been employed in acquainting architects, builders and prospective home owners with adequate wiring specifications. Each of these persons called upon by Campaign representatives was supplied with a copy of the Campaign's Model Wiring Plan and Standard Specifications for Residence Wiring. Much stress was laid upon the fact that to erect a home that would be at all modern five or six years from now, the builder should at least provide for the necessary conduit for range and water heater service.

These data were also distributed through the various building material exhibits throughout the state, through the home economics departments of the Los Angeles Examiner and the Los Angeles Express, to particularly interested guests at the electric homes, and to those attending an electrical appliance demonstration held at The Emporium, San Francisco. In addition they were introduced as text on house wiring in the electrical classes of several high schools in the northern and southern parts of the state.

An ever increasing number of builders and realtors is recognizing the value of advertising electrical conveniences, in listing the advantages that feature their homes. The following extracts from advertisements of a large building company and a realtor are examples:

"* * * Rooms are beautifully papered, attractive lighting fixtures, many electrical convenience outlets * * *"

"In planning this apartment building the most modern ideas have been introduced. Electricity will be used for heating, lighting and cooking."

"Many convenience outlets for electric home comforts."

In accordance with the policy of educating the public to demand better electrical standards, the Campaign has been active in standardizing local elec-

trical ordinances. At the beginning of 1923 twelve communities were carrying on electrical construction under ordinances sponsored by the Campaign and during the year eleven more were encouraged to raise their standards. The movements are being sponsored by cooperative gatherings of electrical contractor-dealers in the various communities. The result of the work has been that eight of the ordinances were passed and are now in effect, whereas the three remaining are held in abeyance pending minor changes.

Activities in the Commercial Field

Representatives of the Cooperative Campaign have been active also in developing business in the commercial field. Efforts in this connection were directed toward bettering illumination for store windows and store interiors. In doing this educational work, the Campaign representatives were greatly aided by the portable window lighting display, which was used for the first time early in 1923.

This display, because of the fact that it is capable of presenting to store owners and managers definite results that can be obtained with proper illumination, has been found to be most effective in producing results. Light intensities varying from 18 ft.-candles to 100 ft.-candles can be produced with the portable exhibit which is also equipped to show the results that can be achieved through the use of color screens. When the exhibit is presented to the merchants that have been assembled to view it, the window is trimmed with a complete display of furniture, rugs and drapes.

The first public showing of the exhibit was in San Francisco in January during the Retail Furniture Dealers' Market Week. The window, and a brief explanatory talk, were given the place of honor on the program of one of the meetings. This meeting was attended by 525 members. After one more meeting the display was taken to southern California to commence a tour of the more important cities there. The exhibit was returned to San Francisco in June and was shown at the Annual Convention of the Pacific Coast Electrical Association. It was then started on a tour of cities in the northern part of the state. Meetings to which merchants from neighboring towns were invited, were arranged in thirty-nine communities. During the year the exhibit was demonstrated at fifty-five meetings before an aggregate attendance of 4,761 persons. This does not include the number of persons viewing it at the Pacific Coast Electrical Association convention or at the California Industries Exposition, where thousands of people stopped to investigate the display.

Actual results, which have meant increased business and returns to many branches of the electrical industry, in a number of cases have been noted immediately following the display of the portable lighting exhibit. Over twenty large installations, traceable directly to the stimulus that was provided by the exhibit, have been recorded and the addition of from two to twenty reflectors in smaller stores have been numerous. Some of the larger installations are recorded herewith.

Four jobs in Los Angeles, calling for 560 reflectors, together with the necessary pipe, wire and boxes for their installation, were ordered following the demonstration.

One Pacific Grove furniture store put in 600 units on 12-in. centers.

One Palo Alto contractor reports window lighting work amounting to over \$1,000 directly traceable to the display.

The power company in Napa reported two new window lighting installations due to the interest the exhibit created.

A drug store in Hanford, upon recommendation of a Campaign representative, increased its window lighting from eight 60-watt units to eighteen 100-watt units and increased the interior illumination 50 per cent. It now has 40 ft.-candles in the window and 15 ft.-candles in the store.

A San Francisco clothing store accepted the Campaign's suggestion and added five units in each of two windows, increased its lamps from 75 watts to 100 watts and added two switches.

A new drug store in Dinuba, under course of construction when the exhibit was there, has been wired in accordance with the suggestions of the Campaign's representative calling for 1½ watts per sq.ft. in the store and 150-watt units on 12-in. centers in the window.

One clothing store in Oakland was equipped with 275 reflectors and 33 spot lights because of the Campaign's exhibit; and in Redding, shortly after the manager of a large local department store had attended the meeting, he ordered 134 new units for his windows.

In addition to these tangible results as evidenced by actual installations there are two other benefits to be directly credited to the window lighting exhibit. First, the immeasurable growth that will come from the seeds it has sown but will develop less rapidly than those cases above mentioned; and, second, the bulk of the newspaper publicity that broadcast the message of better lighting far beyond the narrow confines of the meeting places. Approximately 1,000 in. of this reading matter were secured from some of the many papers interested in the fifty-five meetings, and it is believed that considerably more appeared in the papers than has been assembled.

Merchandising Aids Supplied

Two merchandising campaigns, which consisted chiefly in supplying the electrical dealers with material designed to assist them in the sale of household appliances, were conducted by the Campaign during 1923. The first combined selling drive was held during the first week in June which was designated as "June Bride Week." Dealers were supplied, without cost, with window posters, slogans, newspaper cuts and motion picture slides. A letter was sent to all dealers requesting that they order any material they desired to use. From the replies received, it was possible to determine what newspapers were to receive advertising from the electrical industry. The papers were advised of this business they were to receive and requests were made that they cooperate with the Campaign by publishing the electrical stories that were sent out.

A total of 177 cuts was used for advertising in 193 newspapers and during the week the power companies devoted 2,525¼ in. of space to electrical wedding gift advertising while the retailers carried 1,917¾ in. or a total of 4,443 in. It is impossible to

secure an equally complete and accurate report of the amount of publicity which appeared, due to the futility of attempting to secure copies of all newspapers carrying any; however, there have been assembled 1,007½ in. as a fair example of the volume of publicity which this drive did produce. As for the slides, 74 of these three-color reproductions of the poster were shown in as many theaters.

To stimulate interest on the part of the retailers in the attractive decoration of their windows, eleven cash prizes aggregating \$100 were offered for the

At the same time that these window displays first began to come into evidence, during the first two weeks of December, slides were released in 125 theaters, located in 104 cities and towns throughout the state. These slides, which had a holly border and a reproduction of the jovial Santa Claus of the sales slogans, bore the message, "Make Christmas Last Throughout the Year," and across the bottom, "Give Something Electrical."

Results in this sales campaign have not been recorded, nor has there been time to secure a statement

Table II

District	Campaign successful?			Appliances sold as result	Retailers reporting	Should campaign be repeated?		Would similar Xmas campaign be success?		Electrical dealers using material	Other merchants using it	Was material received in time?	
	Yes	No	Doubt			Yes	No	Yes	No			Yes	No
North	25	2	3	461	65	30	....	30	....	55	10	30	....
South	11	13	4	777	135	17	11	27	1	115	48	25	3
Total	36	15	7	1,178	200	47	11	57	1	170	58	55	3

(Note.) In columns 1, 4, 5 and 8 the results are given by town, the reply of the majority of retailers within a town governing the classification of the answer in the table above, i.e., the majority of the retailers in 25 northern towns voted the campaign a success, the majority of them in two towns voted it unsuccessful, etc.

best window trims, judgment to be based upon photographs submitted. While the number of contestants was disappointingly small, pictures of some beautiful windows were included in those entered in the contest.

Public interest was also aroused by a contest, conducted by a Los Angeles newspaper, that offered to the winner a complete outfit of electrical appliances for her home. Conditions stated that the young lady must agree to be married at a local broadcasting station. The publicity which this plan produced totaled 314¼ in.

It is difficult to lay down in definite figures the actual results that can be directly attributed to such a campaign as "June Bride Week." To determine whether or not the effort was considered justifiable by the retailers, those who were the principal recipients of the benefit, a questionnaire was circulated in fifty-eight towns. The answers to the questions are shown in Table II.

The Christmas Sales Campaign

The plan followed in helping the retailers during the Christmas season was much the same as that employed during "June Bride Week." Three thousand Santa Claus cutouts, 12 in. high, brightly colored and bearing the slogan, "Give Something Electrical," were secured from the Society for Electrical Development, Inc. Eighteen thousand small slogan cards, sixteen of which comprised a set, were printed in three colors. Each card carried an illustration of an electrical appliance and some sales argument that was applicable. This material, together with holly wreaths and red ribbon, was offered to the electrical dealers of the state.

Campaign representatives and the jobbers' salesmen, armed with samples of this material called upon the retailers, urging them to order it from the Campaign office and upon receipt of it to use their ingenuity in arranging windows with a personality. The result was a state-wide distribution and display of this material and many exceptionally attractive windows.

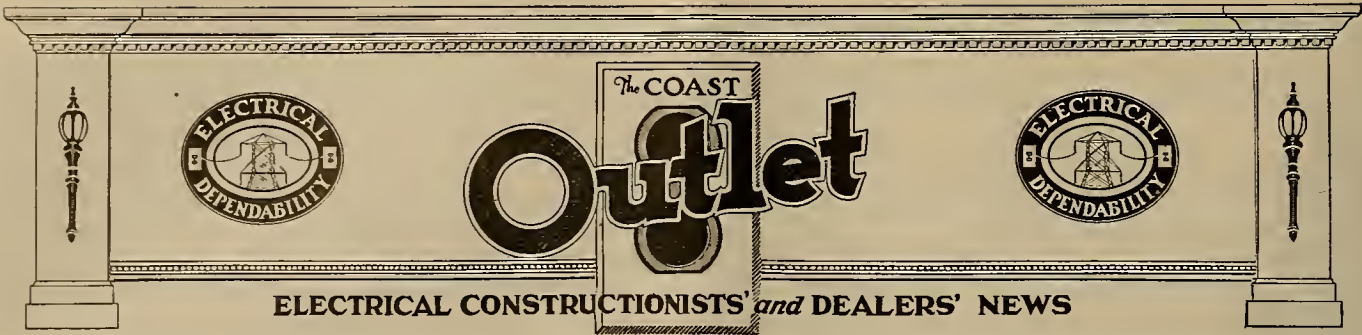
as to the opinion of the dealers as to whether or not the drive was successful from their point of view. The least that can be said for the effort is that much publicity was given to electrical devices during the period preceding Christmas.

The work of the Campaign, during 1923, has passed into history. The results are encouraging. Effort has been well spent and returns should be considered as a goal that should not only be reached but should be passed during the coming months of 1924.

Directive Type of Radio Beacon Aids Aerial Navigation

RECENTLY an airplane flew to Dayton, Ohio, from a point a hundred miles away, the pilot depending for guidance entirely upon the signals received from a new type of radio beacon. In his receiver he heard the letters "A" and "T" repeated over and over. As long as he flew along the correct course both letters were equally loud, but the moment he got off the course to one side or the other one letter became noticeably louder than the other and showed him which way to turn to get back. An ordinary airplane receiving set was used.

This beacon, which was developed by the Bureau of Standards, Department of Commerce, in cooperation with the United States Signal Corps and the Army Air Service, consists of two coil antennas placed so as to cross each other at an angle of 135 deg. Each consisted of a single turn of wire 100 ft. long and 50 ft. high. The transmitting set is automatically connected first to one and then to the other, one letter of the signal being sent over each. The signal from an antenna of this type varies from a maximum in the plane of the coil to almost zero at right angles. A receiving set located along the line bisecting the angle between the coils will therefore receive signals of equal intensity from both, and the ship or airplane carrying the receiving set can thus be guided along this line in either direction, and without regard to conditions of visibility.



Electrical Construction

By E. Earl Browne

THE signal systems of any building should receive as much consideration as any other part of the electrical installation, but until recently the question as to standards in this class of work has received little or no consideration except where the work was of sufficient size to demand the services of an electrical engineer. As a consequence the future upkeep expense to the owner has been a source of much argument and dispute of bills.

For intercommunicating telephone systems all cables should be of the lead encased type in order to prevent the presence of moisture. This applies particularly to cables installed concealed between walls

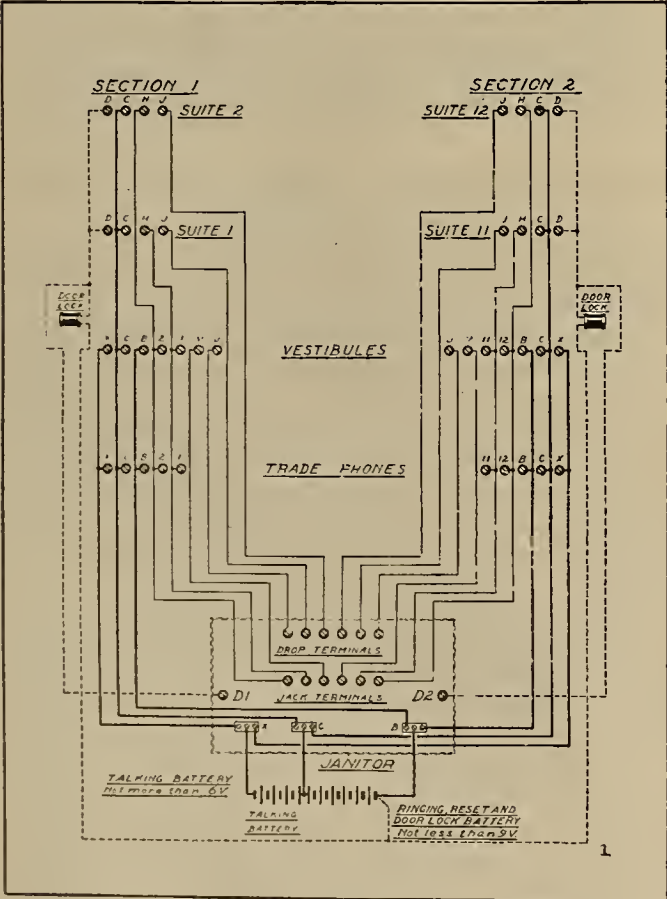


Fig. 1—Wiring plan for S. H. Couch Company, Inc., non-interfering apartment house system.

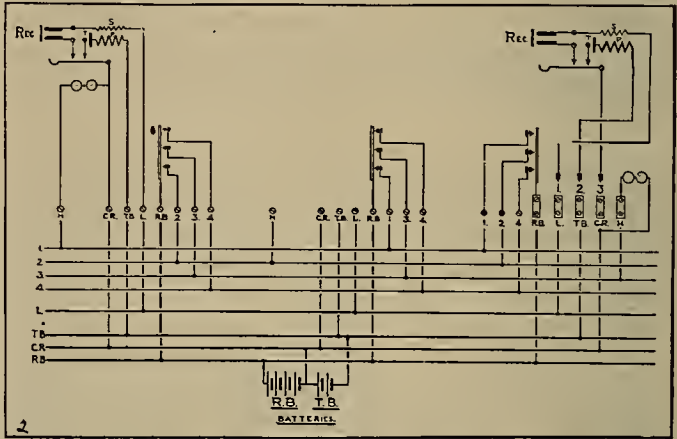


Fig. 2—Wiring plan for Connecticut Telephone & Telegraph Company common talking, selective ringing system.

and floors as it is then impossible, except at great expense, to replace them, should the insulation resistance be lowered to a point where trouble develops.

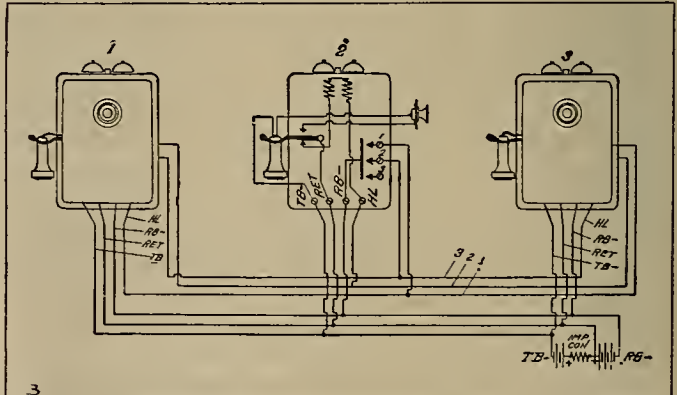


Fig. 3—Wiring diagram for Stanley & Patterson selective ringing, common talking system.

In the case of the common bell and push button the grade of materials used and insulation resistance of the wiring should be at least 50 per cent of the code requirements for a light and power installation.

If the installation is in conduit the use of the lead covering is not so important as it is then always possible to pull in a new piece of cable if trouble develops. Even in the conduit job the use of lead

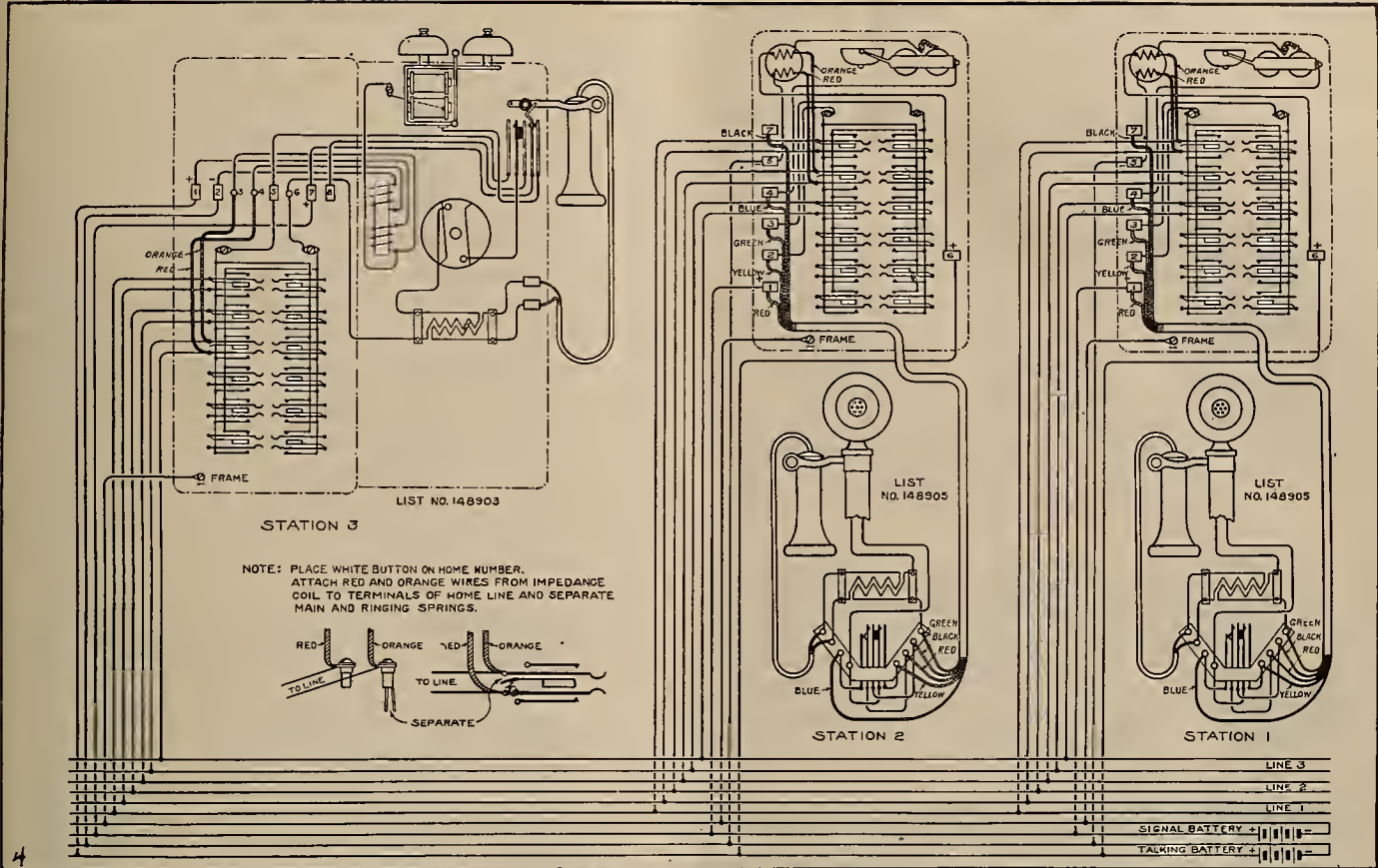


Fig. 4—Wiring diagram for Holtzer-Cabot selective ringing, selective talking system.

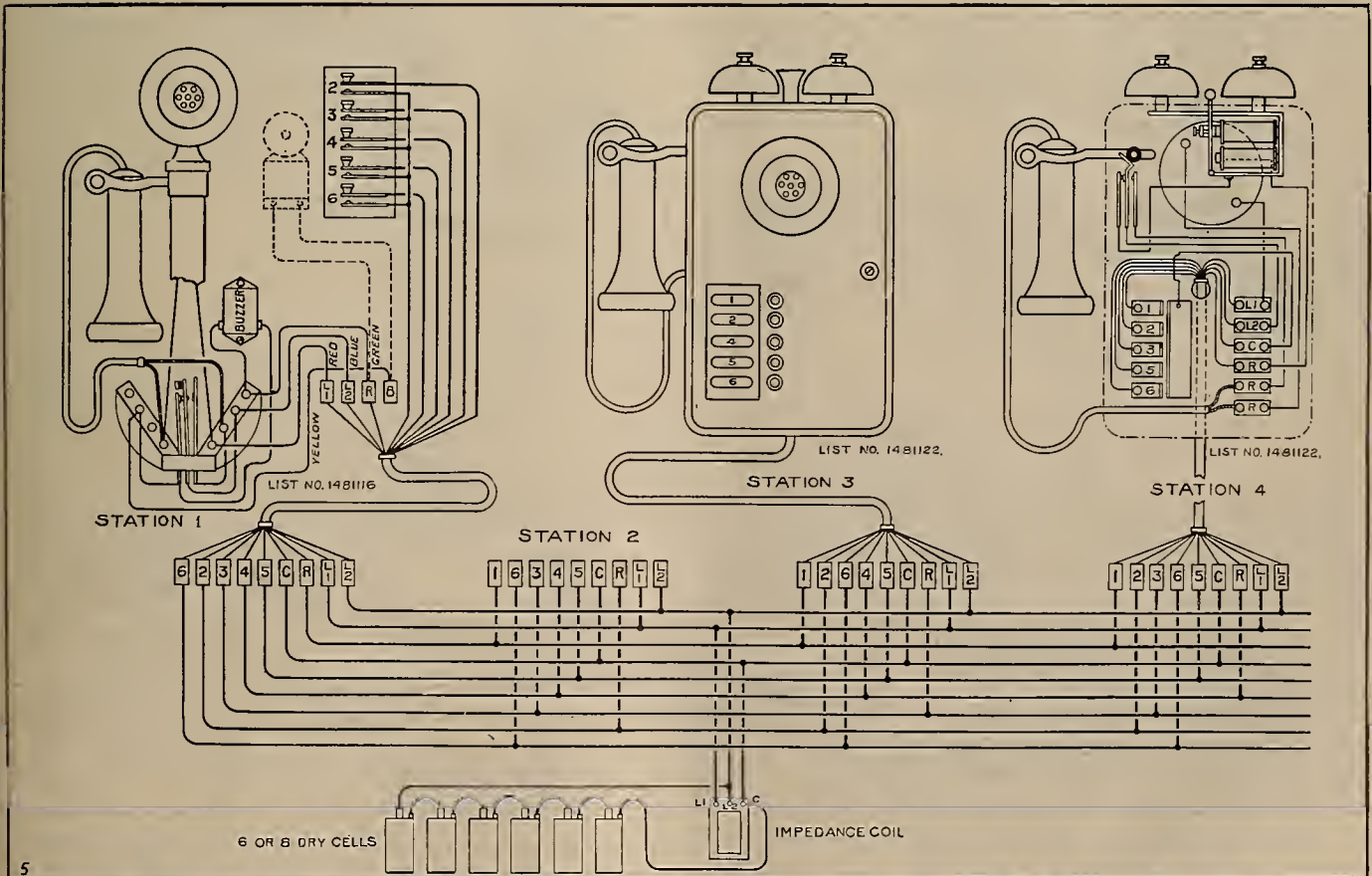


Fig. 5—Wiring diagram for Holtzer-Cabot selective ringing, common talking system.

encased cable is preferable, particularly if any of the conduit installation has pockets and is in such a location that condensation is formed or moisture exists.

All wiring for all types of signal apparatus, be it bells, fire alarm, hospital silent signal systems,

He must first call the superintendent to his office from some part of the plant and then the superintendent must retrace his steps to find out when the new set-up can be made on certain machines, whereas, by the use of the intercommunicating phone, all this time and effort could be saved. Many special features can be incorporated in the wiring connections so that certain results may be accomplished. For example, if a code ringing circuit to all or a few stations in a selective ringing system is desired, it can be accomplished by the use of an additional ringing wire branched to those stations to be so called from one or more locations. If private conversation between certain stations is desired this, too, is easily accomplished.

Figs. 1 to 7, inclusive, show some of the connections of various systems made by some of the promi-

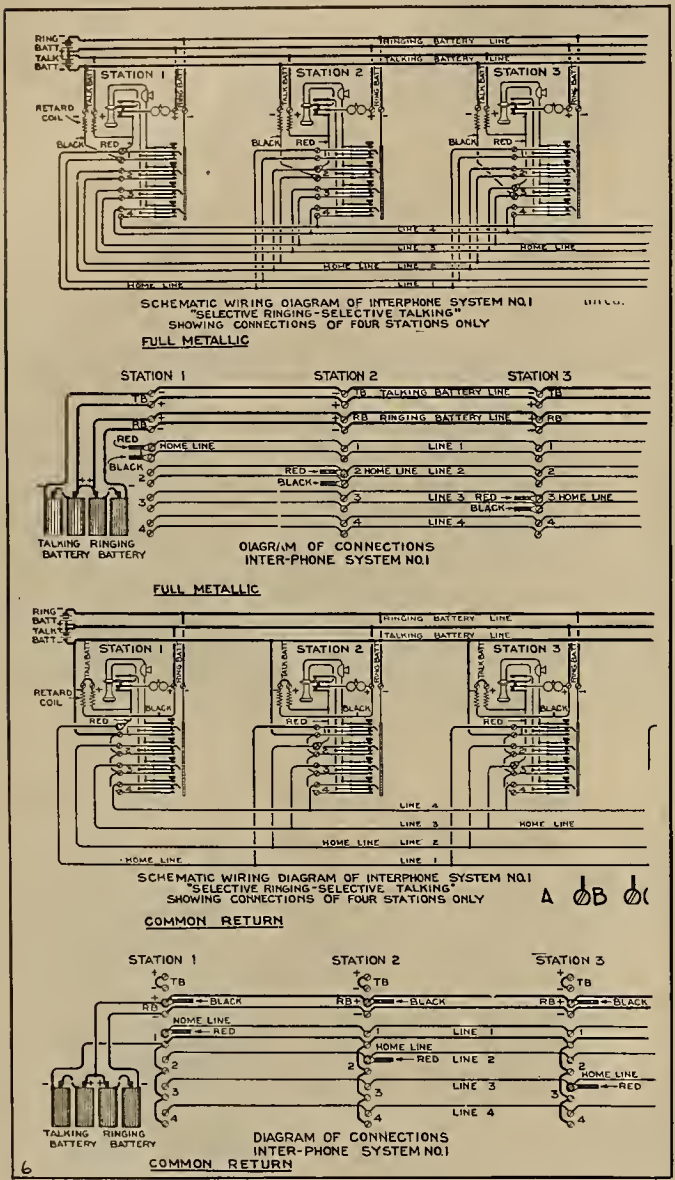


Fig. 6—Wiring plan for Western Electric Company selective ringing, selective talking system.

interphones, or apartment house systems, should be run in such a manner that any equipment may be readily disconnected for testing for location of shorts and grounds.

The intercommunicating telephone as a time-saver in the office, factory and even the residence of two or more floors, is not often realized by those to whom the advantages have not been shown. The result is that a makeshift return-call bell system is often provided, with results far from satisfactory.

For instance, we will assume that the sales manager wishes to discuss with the superintendent the question of when a certain order could be run.

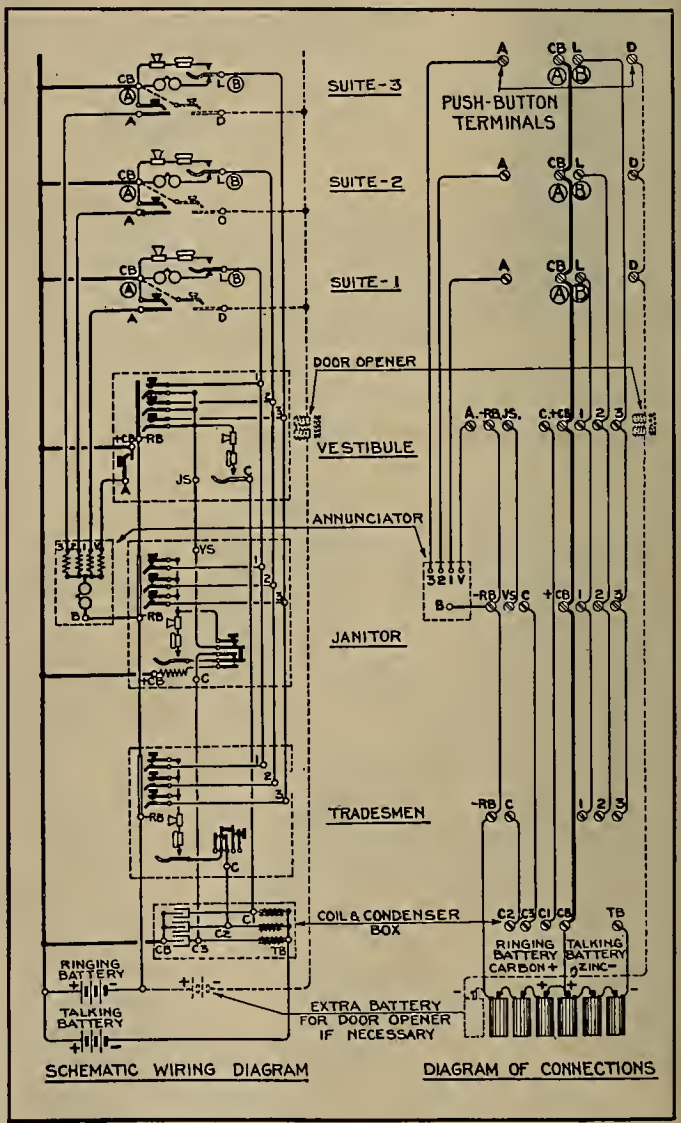


Fig. 7—Wiring plan for Western Electric Company apartment house telephone system.

nent manufacturers. In many of these a bell-ringing transformer can be used in lieu of the signal battery and thereby eliminate any trouble from weak batteries.

Sacramento Valley Electrical Society Monthly Meeting

The Sacramento Valley Electrical Society held its regular monthly meeting at the Hotel Land, Sacramento, Calif., at 6:30 p.m., Feb. 13. "Hal" Willis presided. Reports on the "Courteous Service Club" drive by R. T. Stephens and Roy N. Phelan showed a total membership of 127 signed up to date. Each urged that applications be sent in promptly and that everyone put forth renewed effort during the remainder of the drive. President Willis announced the appointment of the following committee chairmen:

Public Relations, E. W. Florence, Pacific Gas and Electric Company; Membership, S. E. Gamble, Westinghouse Electric & Manufacturing Company; Publicity, Roy N. Phelan, Electrical Contractors' and Dealers' Association of Sacramento; Finance, W. H. Evans, Sacramento Northern Railroad; Program, F. D. Bennet, Weinstock-Lubin Company; Educational, L. J. Fletcher, University of California, Davis, Calif.; Get Well and Visiting, A. H. Hobbs, Pacific Telephone & Telegraph Company; Chamber of Commerce, C. H. Carter, C. H. Carter Company.

The program was in entire charge of L. J. Fletcher of the University of California at Davis, Calif. One of the features of the evening was the College Quartette, comprised of M. J. Heppner, Ralph Mitchell, Pierce Thompson and J. D. Long. R. L. Forsythe played a flute solo and also a novelty number with a musical saw. He was accompanied on the piano by H. J. Shellhouse. J. D. Long of the quartette led in mass singing.

Prof. C. B. Hutchison, director of the branch of the College of Agriculture of the University of California at Davis, Calif., talked on "The Present Agricultural Situation." He called attention to the vital importance to the country of a prosperous rural population and stated that agriculture has been experiencing a panic since 1920, while other industries have been relatively prosperous. He said that agriculture was a basic industry and urged the keeping of a goodly amount of American population on the farms. It was stated that the application of electricity tended to make the farm a better place to live.

L. J. Fletcher spoke on "Power in Agriculture." He stated that statistics showed a definite relation between the amount of power applied per farmer, and his prosperity. Mr. Fletcher said that California was far ahead of the rest of the country in the application of electricity on the farm, but that there has been a laxness in advertising this development to the rest of the country.

1923 National Electrical Code Errata Are Announced

Certain typographical errors have unavoidably occurred in the early editions of the National Electrical Code 1923 edition. These errors are not of serious consequence but in order to ensure correct interpretation of all Code rules the necessary corrections are given herewith. All firms or individuals desiring this information in pamphlet form for pasting in the Code book may obtain the requisite number of copies by addressing the Board of Fire

Underwriters of the Pacific, Merchants Exchange Building, San Francisco, Calif.

NATIONAL ELECTRICAL CODE Errata; 1923 Edition; Dec. 1, 1923

Rules:	
405-c	4th line of note—insert "each" before "such."
503-o	7th line—insert "gutter of the" before "cabinet."
603-d	4th column of table—change "branch" to "braid" (in heading).
701-p	3rd line—change "503" to "502."
701-q	3rd line—change "joints" to "joists."
808-c	6th line—change "Table C" to "Table I."
808-e	2nd paragraph designated "e." Change "e" to "f."
810	Change reference from "1003" to "1002."
814-a	3rd line—drop "of designs" down to head 4th line.
901-b	2nd note, 2nd line—change "e" to "d."
1003-h and i	Transpose and reletter.
1201-h	1st line—change "400" to "600."
1401-c	9th line—change ".05" to ".04."
1403-b	4th line of note—"approximately."
1403-f-g-h	Change to read "d," "e" and "f," respectively.
1404-g	3rd line of note—change "15/32" to "13/32."
1405-a	2nd line—print "Rosettes" with small "r."
1602-d-e-f-g-h	Change to read "e," "f," "g," "h" and "i," respectively.
3102-e	The first paragraph designated "e" should be "c."
3301-b	10th line—change "doors" to "resisting floors."
3802-d	2nd line—insert "weatherproof" before "approved."
3908	Heading (page 141) change to "3905."

INDEX

Auto. prot. of circuits: Border lights—change "811" to "812."
 Feeders at supply station—change "814" to "815."
 Footlights—change "811" to "812."
 Generators—add, and refer to 810, 1002.
 Heating appliances—change "810" to "811."
 Outline lighting—change "812" to "813."
 Signs—change "812" to "813."
 Switchboard instruments—change "813" to "814."
 Border lights—change "811" to "812."
 Grounding, motor frames—change "3001" to "1001."
 Heating appliances, protection of—change "810" to "811."
 Induction coils—strike out.
 Instruments on switchboards—change "813" to "814."
 Multiple series—change "1303-a" to "1003-a."
 Outside work, trolley wires—change "301" to "303."
 Protective devices, fuses, etc.—change "814" to "815."
 Rotating machinery; generators—change "1402" to "1002."
 Series multiple—change "1303-a" to "1003-a."
 Transmission lines—change "303" to "304."
 Yard—change to read "401-b, 405-f."

All-Electric Apartments Rent Quickly in Santa Rosa

Santa Rosa, Calif., is one of the cities that has recently witnessed the installation of an all-electric apartment house. The building is a three-story, frame and stucco structure and contains fifteen apartments. Each of these apartments will depend entirely upon electricity for lighting, cooking, heating and hot water. Special model Universal electric ranges were installed, these being made especially for the small kitchens which were planned for this building. Wesix electric air heaters will provide comfort throughout the entire building and are so installed that each heater is individually controlled. The hot water is furnished by Wesix electric water heaters of the circulating type.

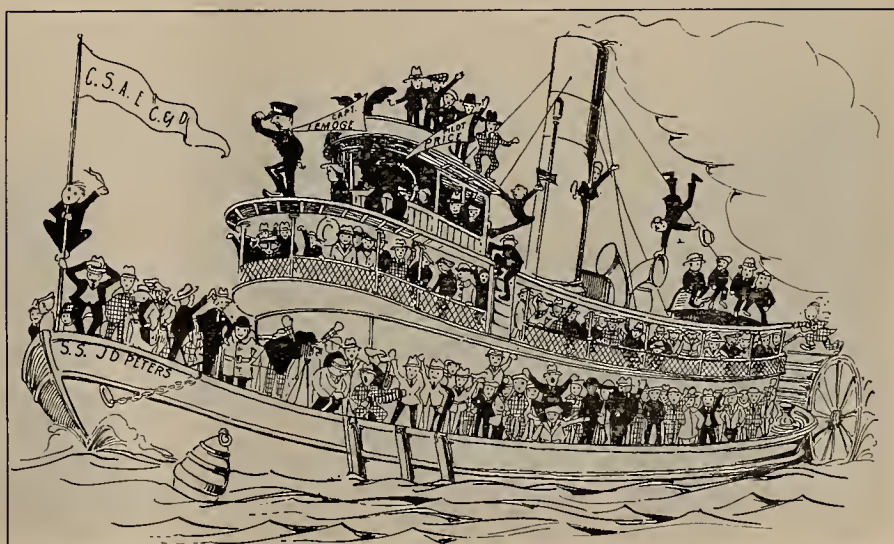
The entire equipment lay-out was made by the Electric Development Company of California.

State Association Meeting to Be at Stockton on March 15

The next quarterly meeting of the California State Association of Electrical Contractors and Dealers will be held at Stockton, Calif., on March 15, 1924. The Hotel Stockton has been selected as official headquarters and all meetings will be held there. The executive committee will meet at 10 a.m. and at 1 p.m. there will be a general business meeting, open to all.

For the accommodation of those members who live in the San Francisco Bay district arrangements have been made for a limited number to travel on the steamer "J. D. Peters," of the California Navigation & Improvement Company, leaving San Francisco at 6 p.m. on March 14. The return trip will leave Stockton at 6 p.m. on March 15 and arrival will be early on the morning of the next day.

The rate for the round trip including transportation, berth and meals while en route is \$11 per person. Reservations should be made through Walter F. Price, executive secretary of the association, 318 New Call Building, San Francisco. Representatives of all branches of the industry are invited to attend this meeting and to participate in the activities of the meeting.



San Francisco Bay members of the California State Association of Electrical Contractors and Dealers will leave that region March 14, on the steamer "J. D. Peters" bound for Stockton.

JOBBER, DEALER AND SALES AGENT



Giant Electric Signs Are Erected in California

Realtor and Sugar Company Use Illuminated Letters to Attract Attention to Home Tract and Company Name

The use of large electric signs, situated some distance from the centers of population, has been given considerable attention by the electrical industry on the Pacific Coast. Advertisers have paid increasing attention to this method of attracting attention to their products, with the result that a number of new installations have been made. Most of the signs that have been placed are so situated that, due to their size, they are legible from great distance.

What is claimed to be the largest electric sign in the world has just been installed in the hills back of Hollywood, Calif. This sign contains but one word, "Hollywoodland," the name of the subdivision on the upper part of which the sign is located. Each letter is 45 ft. high and the entire sign is nearly one-quarter of a mile in length. It is located 1,550 ft. above sea level, at an elevation of 900 ft. above the valley below. From this vantage point it can be read from a distance of ten or twelve miles.

Each letter in this sign is supported by two or three 75-ft. 10-in. top cedar poles set in concrete and heavily guyed four ways from large concrete dead men. The letters are made of unpainted galvanized iron and are fastened to 2x4-in. wooden vertical strips which are fastened to 3-in. iron pipe running horizontally between the poles.

The sign contains 4,000 special sign receptacles and is lighted from metal raceways by 4,000 10-watt lamps placed

in 9-in. centers. The sign is connected to a flasher that flashes "Holly-Wood-Land." The entire sign is turned on and off by a 10-amp. time switch that switches the current into a 10-amp. flasher that in turn operates remote-control switches controlling lamps on the sign. This unique scheme not only works excellently, but brought about a saving of several hundred dollars.

This sign was built and installed by the Electrical Products Corporation, Los Angeles, for S. H. Woodruff, owner of this subdivision. The installed cost was \$20,000.

Another new sign that has recently attracted considerable attention is that of the California & Hawaiian Sugar Refining Corporation located on the sugar refinery at Crockett. The bright glow from this sign has been found to be visible, at night, from a distance of eight miles. The letters "C" and "H" are legible $3\frac{1}{2}$ miles from the refinery either by day or night and the balance of the sign, reading "Pure Cane Sugar," can be read from a distance of $2\frac{1}{2}$ miles in the daytime and from points two miles away at night.

The sign that has been erected by the California & Hawaiian Sugar Refining Corporation is so placed that it is visible from a number of different points. Persons driving toward Crockett along the state highway can see the sign from some distance and passengers on trains can read it while the trains are between Vallejo Junction and Crockett.

The sign is also visible from the bay that is on the north side of the refinery.

Though not as large as the Hollywood sign, the one at Crockett is of large proportions. The two main letters—"C" and "H"—are each 24 ft.



Letters in the "Hollywoodland" electric sign are 45 ft. high. Supports are 75-ft. cedar poles.

high and occupy a space 50 ft. wide. Five feet below these letters is the slogan, "Pure Cane Sugar," the letters of which are 10 ft. high. The thirteen letters in the lower position on the sign occupy a space 120 ft. wide.



The "Hollywoodland" electric sign is visible from a distance of about twelve miles. It is 900 ft. higher than the house in the foreground.



Eight hundred and eighty-three lamps are used to illuminate the sign of the California & Hawaiian Sugar Refining Corporation.

To make the sign attractive and visible in the daytime, white enameled glazed steel was used for the facing of the letters. This surface also provides good reflection for the lamps at night. A total of 883 sockets was placed in the sign and 25-watt lamps are used throughout.

Steel truss work was erected to support the sign which rises to a height of 50 ft. above the surface of the roof on which it is placed. The sign structure is designed to withstand a wind velocity of 100 m.p.h. The Federal Electric Company of San Francisco designed and erected the sign.

Get Ideas from Manufacturers' Agent and Jobber

San Francisco Showroom of Manufacturer Illustrates Attractive Method of Displaying Electric Appliances

To the electrical dealer that is looking for ideas to be used in displaying his stock, the showrooms of the manufacturers' representative or of the jobber presents a solution to the problem. Display ideas, in these showrooms, often are carried to a high point and particularly attractive results secured. If the dealer will observe the methods used,

he can increase greatly the value of his showroom.

Manning-Bowman & Company has installed in its San Francisco office a display that should offer many ideas to the observing dealer. The showroom has been arranged to set off the display of electrical merchandise to the best advantage. The exhibit is open to deal-

ers at all times and an attendant is present to be of assistance to visitors.

B. M. Tassie, Pacific Coast manager for the manufacturer, is responsible for the layout of the showroom. In planning the arrangement, Mr. Tassie undertook to make the display as attractive as possible. He also planned to make it one that could be copied by electrical dealers.

A number of large showcases were specially designed and placed along all of the walls of the showroom. The cases are built of mahogany and are fitted with simple but attractive hardware and good quality glass. Three shelves, so designed that they may be raised or lowered, are placed in each cabinet. The interior of the cases is finished in a soft gray which harmonizes perfectly with the mahogany exterior and at the same time furnishes an attractive background for the nickel and silver-plated electrical appliances that are displayed in the cases.

A special system for lighting the showcases was designed and installed. The light sources are hidden by the mahogany trim and reflectors direct the light so that it falls evenly upon all of the appliances that are displayed in the case. Shadows are eliminated and the brightly polished appliances stand out from the gray background of the case. Pull cords on the exterior of each case provide means of locally controlling the illumination of each showcase.

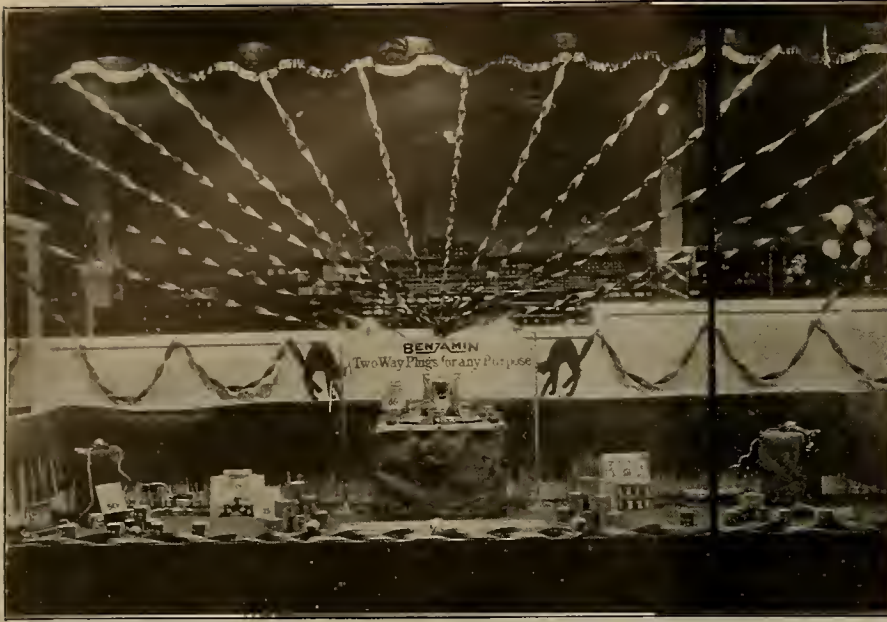
The windows on the front of the display cases are so designed that they may be raised easily should it be desirable to take any appliance from the case to show it to a visitor. A large number of devices are shown in the case, but by careful arrangement any crowded effect has been avoided.

In addition to the showcases placed around the walls of the room, there are several smaller cases with glass on four sides. The woodwork on these cases is also of mahogany, the same material being used on the floor of the display unit. Glass shelves are placed on nickel-plated supports.

The display as a whole presents an attractive view to the visitor, bringing out, as it does, the beauty of the electrical appliances in the exhibit. The result has been achieved by carefully studying the character of the merchandise to be displayed and by designing showcases to display this merchandise.



The illustration at the left shows how the display cases appear when the interiors are illuminated. At the right may be seen a larger portion of the Manning-Bowman & Company showroom with the cases not illuminated.



The Stubbs Electric Company, Portland, Ore., won first prize in the Hallowe'en contest with the window display shown above.

Dressing Windows to Bring Sales and Win Prizes

Western Concerns Win Seven Out of Possible Thirty Awards in Two National Window Trimming Competitions

A first and a third prize in two national window display contests have recently been awarded to two Western electrical concerns. Pictures of window displays from nearly two thousand dealers were entered in the first contest and approximately three thousand electrical establishments entered pictures of their displays in the second competition.

Both of the contests were conducted by the Benjamin Electric Manufacturing Company and window dressers were instructed that the only stipulation was that their displays must feature Benjamin two-way plugs. The manufacturer furnished the window trim material to the dealers and it was only necessary for the decorator to use his own ingenuity in the arranging of the display.

The first contest was centered around Hallowe'en. Rolls of black and orange crepe paper were supplied to the dealers as were four window cards and two window strips which were printed in orange and black. According to reports sent to the manufacturer after the contest, all of the dealers who applied for the window trim material used it to good advantage. In most cases the crepe paper was cut into narrow strips and these strips were used to draw attention to the displays of plugs that the window was built around. In many instances the dealers used the conventional black cat and the witch astride her broomstick to carry out the idea of Hallowe'en.

First prize in this Hallowe'en contest was awarded to the Stubbs Electric

Company of Portland, Ore. The window, dressed by E. T. Hunter, though of a simple nature, proved to be exceptionally attractive. In addition to the window trim material that was used, there were a number of electrical devices attached to two-way plugs. Plugs were also shown on display cords and in the standard cartons.

Seventh prize in the contest was won by the Conklin Electrical Company of Ventura, Calif., and the White Electric Company, of Berkeley, won twelfth prize. The other prizes were awarded to electrical concerns in the Eastern and Middle Western states.

In the second competition which was conducted during Thanksgiving week, interest among the electrical retailers was even greater than in the first one, according to the number that entered. Out of nearly three thousand electrical dealers who sent in pictures of their windows, the White Electric Company won third prize, thus placing in both contests. B. A. White, manager and owner of the concern, was responsible for both of the prize winning displays.

The second window trim, which won third prize in the national contest, was designed to show the difference between the old-fashioned Thanksgiving dinner table and the modern one. Large dolls were used to good advantage to represent the diners and in the window devoted to the old-fashioned idea, these figures were dressed in quaint Puritanical costumes. The table, at which the dolls sat, was illuminated by a single candle, the idea being to indicate that no electrical conveniences were available at the time. This window was labeled, "The Old Way."

Directly across from the first window was one labeled, "Benjamin Two Way." Here the dolls were seated at a small table upon which there stood an electric toaster that was attached by means of a two-way plug to a bracket fixture on the back wall of the window. This scene gave the impression that it was illuminated by a light connected to the two-way plug that served the toaster. Small placards and price cards aided in calling attention to the large display of plugs. A large two-way plug was also illustrated in each of the display windows.

Three other electrical dealers operating in the Western states were awarded prizes in the Thanksgiving window trim competition. R. Stoehrer's Electric Shop of Oxnard, Calif., in a single-window display showed the uses of two-way plugs as aids to securing the most convenience from electrical appliances. The Electric Shop, Shelby, Mont., used, as a background for the display, an enlarged illustration of one of the plugs and radiating from this central figure were strips of crepe paper. In the foreground were lamps and appliances connected to two-way plugs. Congor's Electric Shop, Woodland, Calif., employed an electric train to attract attention to its display. Turkeys and other appropriate Thanksgiving symbols adorned the background of the display window.

That all of the dealers who participated in either contest were completely satisfied with the results that were secured from the feature displays was assured, according to the manufacturer, by the remarks made following the close of the two competitions.



Third prize in the Thanksgiving competition was awarded to the White Electric Company.

Electrifying Denver's Modern School Buildings

Electrical Cooperative League of That City Increases Number of Outlets Through Educational Campaign

Proper electrification of the public schools now under construction or about to be built in Denver, Colo., is believed by the Electrical Cooperative League of that city a major requirement in the education of the younger generation. Proper lighting with adequate switching facilities and the required number of convenience outlets in each class room are features which the pupils will appreciate, unconsciously or otherwise, according to a report recently issued by S. W. Bishop, executive manager of the League.

As part of the League field work, unusually close contact has been maintained with the engineers of the school board and the various architects commissioned to draw the plans for the twenty-two school projects, costing in excess of \$6,000,000. Standard features applicable to all classes of construction were recommended to the board's chief engineer and it is understood that these provisions have been followed in detail.

The extent to which the League's recommendations have been accepted is set forth in the following results:

1. Increase of 200 watts to average class room, thus boosting the illumination 1.2 foot-candles to an average intensity of 4 foot-candles.
2. Increase of 1 to 2 watts for every 3 sq.ft. in gymnasiums and auditoriums.
3. Use of standard commercial lighting units generally of the total enclosing type.
4. Average distancing of ceiling outlets in corridors reduced from 40 to 20 ft.
5. Installation of conduit in all class rooms, assembly halls and auditoriums to permit ultimate use of loud speakers in connection with the plan to "radioize" Denver's public school system. (In the meantime this conduit is finding economical use in providing wires for clocks and buzzers.)
6. Installation of one convenience outlet, duplex flush type, and addition of one switch in every room, large or small.
7. Distancing of foot lighting outlets on stage reduced from 12 to 6 and 9 in.
8. Addition of one and generally two Klieg outlets to school auditorium stages.
9. Footlights supplemented by border lights on all stages.
10. Installation of convenience outlets in orchestra pits of all school auditoriums.

The above general wiring improvements have been embraced in the general instructions to architects responsible for drawings and plans of the different school jobs. The League's offensive to improve school electrification was launched immediately after the bond issue had been passed and individual architects had been commissioned to design the different schools.

In line with this activity, it is the practice of the League staff to give careful study to each set of plans, after which suggestions and recommendations are made to school officials, principally the engineering department. Confirming letters covering these recommendations are directed by the League in every case as a means of impressing the importance of complete wiring.

Should not schools adhere to the same wiring standards adopted in the best homes and thereby familiarize pupils as well as educate them? If, for instance, better class homes were equipped with convenience outlets, should not their children be familiarized with their use while in school, especially those of

poorer families where only an exposed lamp and suspension cord, perhaps, comprised the extent of wiring?

Reference to the illumination tables in "Standard Lighting" and their practical application proved a strong argument in favor of improved lighting and the use of standard commercial units exclusively. The tables of recommended foot-candle intensities convinced school executives that higher wattage capacities were based on standard practices and not vague guesses.

The installation of at least one convenience outlet in each class room permitted a greater flexibility and a complete use of electricity, it was argued. The old argument that a convenience outlet in the baseboards of the individual rooms permitted the easy operation of appliances, especially in the case of stereopticon lanterns during lectures, without marring the fixtures overhead with ugly, inconvenient wires, found great favor.

The argument that schools were coming more and more to be community centers and that they were finding growing use for neighborhood purposes and should therefore be equipped to fill more than the one purpose for which they were planned originally, stimulated the interest of school officials to the extent of improving stage lighting. Likewise

Something of the results in boosting business for the electrical industry is shown by the field work of the League. Figures show an actual increase of 5,012 outlets to jobs, such as office and store buildings, display windows, theaters, schools and residences.

Outlets	1st 6 Months	2nd 6 Months	Total
Convenience.....	1,437	1,374	2,811
Switch.....	205	312	517
Bracket.....	186	198	384
Ceiling.....	571	608	1,179
Miscellaneous.....	45	76	121
Total,	2,444	2,568	5,012

In obtaining these additions to jobs and in pushing other business building activities, a total of 1,419 contacts was made.

	1st 6 Months	2nd 6 Months	Total
Architects.....	142	93	235
Builders.....	171	96	267
Owners.....	71	94	165
Realtors.....	46	18	64
Newspapers and Miscellaneous..	125	100	225
Electrical.....	329	134	463
Total,	884	535	1,419

The results that have been attained have been most satisfactory. Members of the Electrical Cooperative League of Denver have heartily endorsed the action taken in connection with the school electrification campaign.

THE GENIE OF YOUR LAMP

By JOE OSIER

Aladdin, according to old press dispatches, rubbed his wonderful lamp and was immediately possessed of that which he most earnestly desired—

And nothing was excepted.

Had he desired a pennant-winning ball club—that would have been his; likewise, had he craved an umpire that

would call every strike a ball, or vice versa—

Pronto, up would have jumped the toughest "umps" that ever waved a broom or won an argument and, from then on, it would have been impossible for Aladdin's aggregation to lose a game.

Assuming all the above to be true—that this famous fabled Oriental did have the world by the tail with a downhill pull—

Things were pretty soft for him and he had no occasion to fume, fret or fuss—but—

Unfortunately, men in the Electrical Industry are not possessed of this wonderful lamp and wishing will not avail them. Before their wishes come true in this—

Jazzy, know your costs day,—

They must strut their stuff and do their dance according to the book— Else they'll end up in a blind alley.

Today, men of the electrical game who are succeeding, rub the non-essential and the flap-doodle from their



Aladdin's wish for better business gets short circuited.

minds; rub the frowns from their brows and the February looks from their faces and—

Swing only at the good ones.

They succeed by rubbing their windows and showcases and rubbing out low bids—

Turned in by witless ones for the alleged purpose of keeping an organization intact.

The day of Aladdin and the lamp is done and the genie who lived but to serve the owner of the magic carpet is a dead fish.

He broke his back trying to carry a Swiss cheese quarry to a well-wisher—and so—

Those who spend their lives planning and pining and watching and wishing, may as well check out—

Relinquishing their rooms to guests who know that the "open sesame" to success is—

Brains, well directed effort and unceasing work.

This is true: The Genie of your lamp is yourself—and—

Bagdad is but around the block.

INDUSTRIAL NEWS



Colorado Springs Is to Vote on Municipal Ownership

The question as to whether or not the City of Colorado Springs, Colo., will engage in the business of supplying light and power to the residents of the city will probably be decided at a bond election, the date for which has been tentatively set early in April. It will be necessary to bond the city for about one million dollars if the proposals which have been made are accepted.

If the bond issue is sanctioned by the voters of Colorado Springs the city will take over the properties of the Colorado Springs Light, Heat & Power Company. This company has been operating under a temporary permit since Sept. 8, 1923, when its 25-year franchise expired.

The situation in which the utility company was precipitated last June when the taxpayers refused the company an operating franchise is still unfathomable, but recent reports received from that city indicate the possibility of a special election being called shortly asking the authorization of a bond issue for the city to build such additional lines and standby generating equipment as might be found necessary to insure complete municipal operation.

Under the terms of the old or Jackson franchise, title to the hydroelectric plant near Manitou passed to the city and since the expiration of the franchise the Colorado Springs company, a subsidiary of the United Gas & Electric Company, has been using the plant on a rental basis from the city.

The city council has already authorized the construction of a transmission line from the hydroelectric station to the city to accommodate the pumps at the municipal water works and some if not all of the ornamental street lighting, and it is understood that the city auditorium also may cut in on the special line.

The latter installation may be the outgrowth of a disagreement between the company and the city manager which has been carried back and forth in the daily papers relative to the alleged over-motoring of the auditorium. Several resolutions have also been passed by the city council forcing the company to revise charge schedules for certain classes of customers using large amounts of energy both for power and lighting purposes.

Considerable confusion has been injected into the situation through the action of the Colorado Springs & Interurban Railway Company announcing to the city council that owing to operating losses sustained due to the increase in automobile traffic the company would not apply for a renewal of its franchise on all lines and suggesting that the city take up the question of buying the

company's property, valued around \$3,500,000.

This action served as a bombshell in city politics, according to recent newspaper reports, because of its having been presented just at the time the city council was putting the finishing touches on the proposed bond issue resolution for municipal ownership of the central station.

The street railway company belongs to the Winfield Scott Stratton estate, one of the city's chief benefactors. The company has not paid bond interest for two years and no dividends on preferred stock of \$500,000 outstanding have been paid since 1912. According to D. P. Strickler, president of the company and prominent Colorado Springs attorney, the company may not operate after the expiration of its franchise in March, 1926.

Los Angeles, Calif., Engineer Testifies on Dam Project

The development of water and power by a dam on the Colorado River at Boulder Canyon is necessary for the future water supply of the city of Los Angeles, Calif. This, in effect, is the gist of a statement made at the recent Congressional hearing on the Colorado River dam bill by William Mulholland, chief engineer of the Los Angeles Aqueduct. Mr. Mulholland stated that no volume of water greater than that now being received from the Owens River Valley could be acquired from that source, and that there was no place other than Boulder Canyon where sufficient water could be obtained to supply Los Angeles.

In cross-examination Mr. Mulholland was questioned regarding other projects suggested for flood control of the Colorado River. He gave as his opinion that these were all less practical than the one proposed for Boulder Canyon.

It was decided by the committee in charge of the hearing that written invitations to testify before it should be issued to representatives of all private power companies affected, to representatives of civic bodies, or others interested in further discussion of the Colorado River dam project.

Circulation of petitions to place the \$500,000,000 California Water and Power Act on the ballot at the November election will be started in the near future, according to press reports. The measure that will be placed before the voters this year is now in the hands of the state attorney general. It is understood that the measure that will be on the ballot this fall will be practically of the same form as the one that was defeated by a large majority at the 1922 election.

Seattle, Wash., Will Investigate Skagit Power Project

A complete inquiry and investigation into the work done on the Skagit hydroelectric project under development by the City of Seattle, Wash., has been ordered by the city council, and a committee of three councilmen, C. B. Fitzgerald, Philip Tindall and E. L. Blaine, appointed to conduct the probe. The committee has drafted a questionnaire to be presented to J. D. Blackwell, city engineer, asking for information on progress of construction of the Gorge Creek plant. The questions asked include:

"When will the different units of the plant be completed and what will be the cost of each? What, if any, portion of the work included in the contract with R. C. Storrie & Co. (Gorge Creek contractors) has been or is intended to be executed by the city and at what cost? What portions of the Gorge Creek plant have been done by contract, and what ones by day labor? What remains to be done to complete the plant? How do you know that the work will be completed by May 1?"

After various plans had been considered for securing outside engineering help, or through local civic bodies, it was decided that any investigation lies with the council.

Mayor E. J. Brown is not in accord with the sentiment of some of the council members that an investigation should be made before the remainder of the \$11,000,000 bond issue, approximately \$937,000, be spent to complete the Gorge Creek unit. Mayor Brown expressed the opinion that it would be "fatal to interfere with the development of the Skagit project until the Gorge Creek plant has been completed."

The state bureau of accountancy has ordered three experts to audit the accounts of the project. The Skagit accounting system has been kept separate from Seattle's bookkeeping departments and the city's accountants have had no access to the books.

Correspondence Course to Have Portable Laboratory Sets

The Extension Division of the University of California has announced that correspondence courses in elementary physics have been prepared for students of the division. Portable experimental laboratory equipment has been prepared so that students will be able to do laboratory work in addition to the regular course reading.

The laboratory equipment has been designed so that it may be securely packed and sent to anyone in California who cares to take the course. Ten sets of the equipment are ready for use.

City Faces Choice of Special Election or Law Repeal

The city council of Los Angeles, Calif., on Feb. 13 adopted a resolution declaring its intention to submit to the people at the election to be held May 6, 1924, the authorization ordinances relative to the properties of the Los Angeles Gas & Electric Corporation. These ordinances empower the Los Angeles public service commission to expend not to exceed \$50,000 in having the California State Railroad Commission make a survey of the company's electric system for the purpose of fixing the price the city shall pay to acquire it.

The Los Angeles Gas & Electric Corporation on Jan. 17 had filed referendum petitions demanding the repeal of the ordinances or their submission to the voters for approval or rejection at a special election. The signatures on these petitions were only partially checked, the results showing that 10 per cent of the registered voters were represented. The company brought suit to compel the city clerk to make a further check to determine whether 15 per cent of the qualified electors of the city of Los Angeles had signed the petitions. A 15 per cent petition would compel the repeal of the ordinances or their submission to the voters at a special election.

The council stated that the purpose of the resolution adopted was to let the Superior Court know that the ordinances would be submitted to the people. It further explained that by consolidating the election with the presidential primary to be held May 6 the expense of holding a special election, estimated at \$100,000, would be saved.

However, on Feb. 20 the Superior Court handed down a decision that the city must count all the names on the petitions filed. If it develops that 15 per cent of the registered voters signed, the council must call a special election or repeal the ordinances.

New Electrical Code for Denver Is Being Considered

A new municipal electrical code for Denver, Colo., for safety and advanced wiring practice, promises to be in the same class as automobiles with four wheel brakes and balloon tires, is the plan of Charles F. Oehmler, city electrician, according to recent reports from that city. Although the city, a year ago, put into practice a revised ordinance that was considered a marked improvement, Mr. Oehmler and his corps of inspectors believe that further improvements can be made in the light of revisions contained in the latest code of the National Board of Fire Underwriters.

It is not known whether the new regulation supplanting the 660-watt rule will be given maximum allowance, but it is believed a generous increase of circuit wattage will be permitted and strict adherence to proper fusing will be maintained. The Public Service Company of Colorado is already following the 15-amp. fuse standard for branch circuits when its service men are called to replace fuses.

Notification has already been given to the electrical industry of Denver by Mr. Oehmler that the early discontinuance of the use of black enamel boxes will be required and that after Jan. 1,

1925, conduit and conduit fittings used in all classes of construction must be galvanized.

A recent city ruling also provides that bell ringing transformers will not be permitted in distributing cabinets, attics or closets and that they must be installed in the basement on metal surfaces, as close to the outlet as possible and with air space not less than 1/4 in. between the transformer and the ceiling or wall.

Another feature of the new code will be the insistence on the use of standard concealed contact or pin protected flush type convenience outlets. This change was recommended by the Electrical Cooperative League of Denver.

Washington Water Power Co. Reports Appliance Sales

The Washington Water Power Company of Spokane, Wash., has recently issued a report covering the number of current-consuming devices sold by the company during 1923. The gross sales value of the appliances was \$424,000, of which \$234,000 was credited to Spokane and \$190,000 to the outlying towns. Spokane and vicinity represent a population of 120,000 and there are about 50,000 people in the outside towns.

The total number of current-consuming devices sold on the system during 1923 was as follows:

Appliances	Spokane Sold	Country Sold	Total Sold
Vacuum cleaners	687	274	961
Waffle irons	304	305	609
Electric irons	838	724	1,562
Gurling irons	255	195	450
Percolators	211	177	388
Toasters	246	227	473
Air heaters*	511	375	886
Grills	56	46	102
Hot plates	88	70	158
Washers	245	401	646
Ranges	606	429	1,035
Heating pads	101	88	189
Miscellaneous*	91	584	675
Grand total,	4,239	3,895	8,134

*Under the heading of "Miscellaneous" are classified devices such as hair dryers, immersion heaters, soldering irons, Sew-Ez motors, vibrators, bake ovens, stand lamps, fans, ironers, sewing machines.

In 1922 the total number of devices sold amounted to 2,461 in Spokane and 1,650 in the country. This total of 4,111 compared to 8,134 in 1923 shows an increase of 4,023 devices.

Supervisors Requested to Delay Hetch Hetchy Bond Vote

Citizens of San Francisco will not be called upon to vote on the \$39,000,000 Hetch Hetchy bonds until late in August or early in September, according to an informal agreement reached by the Board of Supervisors at their meeting of Feb. 25. The reason for the delay is that Mayor Rolph has asked for a two-months' leave of absence and at the same time requested that any election be postponed until his return. Action on the request was withheld until the meeting of March 3, but the informal agreement was reached by the board and the mayor.

Sealed bids on \$5,281,000 worth of Hetch Hetchy water bonds of the 1910 issue will be opened by the Board of Supervisors on March 24. The funds secured from the sale of the bonds will be used in financing the city's water and power project activities during the present year.

Plans for June Bride Week Are Considered by Campaign

A decision, to the effect that the California Electrical Cooperative Campaign would sponsor June Bride Week for the third time, was reached at the last meeting of the advisory committee of that organization. Preliminary plans covering the methods that would be employed to create interest in the week were discussed at the meeting. No definite conclusions were reached and the matter will come up for final decision at the next meeting of the committee, to be held at Del Monte, Calif., on March 5.

A committee, known as the June Bride Week committee, was appointed to have general supervision of the activities of the California Electrical Cooperative Campaign in connection with the week. P. H. Booth, Edison Electric Appliance Company, Los Angeles, is the chairman of the committee. He will be assisted by C. C. Hillis, Electric Appliance Company, and F. H. Woodward, Great Western Power Company, both of San Francisco.

The week of June 2-7 will be called June Bride Week and every effort will be made to increase the sale of electrical appliances during the six days. Material to aid dealers will be supplied a sufficient time prior to the week to give retailers ample opportunity to make use of it.

Courses in Illumination Offered to Utility Employees

All men in the new business department of the Pacific Gas and Electric Company who meet the public in the course of their work are now receiving training in illumination engineering. This includes the gas sales department as well as those in the electric sales department.

Classes of about thirty people have been held on Tuesdays and Thursdays of each week since Jan. 29. Illustrated talks and stereopticon lectures have been given by the following men:

H. H. Allison, Pacific Gas and Electric Company, General Lighting Practice.

R. S. Prussia, Westinghouse Electric & Manufacturing Company, Window Lighting as an Advertising and Sales Medium.

H. C. Barnard, National X-Ray Reflector Company, Flood Lighting and Window Lighting.

Glark Baker, National Lamp Works, Practical Illumination Formulas and Lamp Efficiencies.

H. E. Mahan, General Electric Company, Industrial Illumination.

Garl Martin, Benjamin Electric & Manufacturing Company, Industrial Lighting.

G. A. Russell, Pacific Gas and Electric Company, Resume and Quiz.

The subjects of decorative residential and commercial lighting will be taken up in the future. It is expected to carry on these lectures for eight or ten more classes.

Railway Company Builds Eight Electric Locomotives

The Pacific Electric Railway of Los Angeles, Calif., recently put into service a 60-ton, 820-hp. electric freight locomotive. It is said to be the largest of its kind ever built on the Pacific Coast.

With the exception of castings and frames, which were cast in local foundries, the locomotive was built entirely in the railway company's shops where seven more of the same type are now being completed. The cost is estimated at \$45,000 each.



Night scene on Hollywood Boulevard looking east from Cahuenga Avenue, showing the new ornamental lighting system recently installed.

Hollywood Installs Ornamental Lighting System

Two Lantern Type Units Illuminate Main Boulevard Through the Business Section of Southern California City

What is claimed to be the most unique and one of the most ornamental and attractive street lighting systems in the United States has recently been installed and put into operation on Hollywood Boulevard, in Hollywood, Calif.



Ornamental lighting units of this character have been installed on one of the main thoroughfares of Hollywood, Calif.

The new street lighting extends from the intersection of Vermont Avenue and Hollywood Boulevard to the intersection of Hollywood Boulevard and Cahuenga Avenue, or a distance of about two miles.

The lighting system includes 220 union metal two-light standards which were especially designed by the General Electric Company for use on Hollywood Boulevard. The standards are 17½ ft. high to the light centers. The lamps are of the paneled lantern type and are equipped with dome type refractors, while the glass used in the panels is light alabaster rippled panel. Each standard is equipped with a pot-head, while the lanterns are equipped with auto-transformers with taps for 400, 600 and 1,000-cp. lamp capacity, while the circuit in use is 6.6-amp. primary. Each lantern is at present equipped with 400-cp. Mazda lamps, which may be increased with the aid of the auto-transformer at any time, with no additional cost to the property holders.

The object of installing the dome type refractor for each lantern is to redirect the rays of light which would be lost above the horizontal. By using the refractor a more even and more effective distribution of light on the street surface is secured and dead shadows are eliminated. The design employed also permits of wider spacing between standards, in this case the standards being spaced 120 ft. apart and on opposite sides of the street.

A great deal of the credit for the installation is due to O. J. Helvey, street lighting specialist of the Los Angeles office of the General Electric Company, while the construction work was installed by the Paulson Construction Company of Los Angeles.

The Puget Sound Power & Light Company and the Pacific Northwest Traction Company plan the expenditure of \$450,000 in extensions and improvements in Whatcom and Skagit Counties, Wash., during 1924, according to Harry B. Sewell, manager of the Pacific Northwest company. Of this sum, \$140,000 will be expended in power line extensions; \$60,000 for a steel bridge at Hibridge; \$160,000 in rebuilding or filling in interurban trestle at Clayton Bay, and the remainder of the sum in miscellaneous improvements to the company's power and light properties.

Kitchen Lighting Campaign Held in Rocky Mountain Region

The slogan "Daylight Your Kitchen" is rapidly being disseminated in the Rocky Mountain region as the result of a number of kitchen lighting campaigns started during the month of February. The Public Service Company of Colorado launched the activity in Denver, Colo., and the cities on the western division of its property, and during the first half of the month nearly five thousand units were sold throughout the system, according to early reports. Meetings were held in Denver and each of the northern Colorado towns including Cheyenne, Wyo., at the start of the campaign by the commercial department of the company. J. G. Munro of the Bryan-Marsh division of the National Lamp Works and Harry Swindell of the Ivanhoe-Regent Works of the General Electric Company assisted in conducting the meetings.

The Mountain Electric Company, one of the larger Denver jobbers, has been unusually active in developing campaigns in other parts of the region. Several conferences, to which out-of-town central station executives were invited, were sponsored by John J. Cooper, general manager of the company.

Other central stations which have already started campaigns or contemplate doing so are the Arapahoe Electric Light & Power Company, Arvada Electric Company, Jefferson County Power & Light Company, Fort Lupton Light & Power Company, Home Gas & Electric Company, Colorado Power Company, Arkansas Valley Electric Company, Southern Colorado Power Company, and Colorado Springs Light, Heat & Power Company.

The selling scheme in each case is to provide 30 days' free trial with the bill payable in twelve monthly installments. Electrical contractors are making the installation of the units and the additional convenience outlets.

Operators to Fight California Tax on Electric Trucks

Under the direction of the Electric Transportation Association, San Francisco, Calif., operators of electric trucks are preparing to contest the constitutionality of the recent California Motor Vehicle Act, placing a flat charge on electric trucks of \$50 in addition to other taxes provided by the Act.

It is claimed that this action discriminates against electric trucks not only because there is no reasonable basis for any such classification but because it is felt that electric trucks should not be subject to taxes as high as those on gasoline vehicles. This stand has been taken because the radius of the electric truck is much smaller and necessarily its speed is much less; consequently its use of the highways is much less than a gas-driven motor truck.

In the form of protest it is also being pointed out that in the states of Maryland and Massachusetts, a tax on electric vehicles is only one-half that placed on gasoline trucks and in the State of Pennsylvania, at the last meeting of its Legislature, an act was passed giving a substantial preference to electric trucks. These are precedents, it is claimed, which should be followed in California.

Review Activities of California Water Rights Division

A summary of the activities of the Division of Water Rights of the State of California for the year 1923 has recently been issued. The report states that during the past year 567 applications for water permits were received: 622 applications were acted upon; permits were granted to 324 applicants; 295 applications were rejected; and 169 licenses were issued. The volume of work done by the Division has increased steadily since 1914 when the California Water Code providing for the State Water Commission, the predecessor of the Division of Water Rights, was passed.

According to the report, the number of filings made during the last few years indicates that there will be greater activity in the construction of water projects than at present, as 45 per cent of the applications received since 1914 were made during the years 1921, 1922 and 1923. Several years usually elapse between the time of receipt of the application and actual construction on the larger projects. The applications received during 1923 contemplate the development of two million horsepower of electrical energy, the irrigation of one and a half million acres and the storage of three million acre-feet of water by municipalities for domestic purposes.

The Division states that during the year it was also active in the settling of water rights on the Shasta River in Siskiyou County and on the Whitewater River in Riverside County. A complete investigation of the streams in the San Gabriel River Basin, in Los Angeles County, was started last summer. It will take several years to make the entire study of underground and surface water. A total of six such investigations, requiring from several months to several years to complete, were under way during the past year.

To Hold Course for Meter Men in Denver March 17-21

The second annual short course of instruction for meter men will be held at the University of Colorado, Denver, Colo., March 17-21. Utility and meter men of the Rocky Mountain region have been invited to attend the course which will cover instruction in calibration and reading of meters, proper methods of connecting and testing, and the calibration of electrical instruments.

Prof. C. M. McCormick of the electrical engineering department of the University of Colorado will be in charge of the course. Frank C. Yerkes, superintendent, electric meter department of the Public Service Company of Colorado, will act as an instructor.

The course was initiated and sponsored by the Public Service Company of Colorado last year.

Power Plant on California River Is Put in Operation

The storage dam and power house being constructed about $1\frac{1}{2}$ mi. below Bullards Bar on the north fork of the Yuba River by the Yuba Development Company have been completed. Generation of electrical energy was started on Feb. 19, ten days before the date set for the opening.

The dam is 183 ft. high from bedrock to the top of the spillway surmounted by a 19.5-ft. bridge, making a total height of 202.5 ft. The length is 552 ft. It will have a storage capacity of 32,000 acre-ft., forming a lake 7 mi. long. The penstock is 8 ft. in diameter and 300 ft. long. The capacity of the spillway will be 60,000 sec.-ft.

The power house is designed to develop 7,500 kw. with an ultimate capacity of 15,000 kw. with a static head of 175 ft. The transmission line is 11 mi. long and will carry 60,000 volts. It will tie-in with the Pacific Gas and Electric Company's system at the power house at Colgate, Calif.

Construction Crews Served Meals Near Tunnel Headings

Employees of the Southern California Edison Company engaged in driving the Florence Lake Tunnel, for some months have been eating their mid-shift meals inside of the tunnel. To provide hot meals for the men at work on the headings, which are about two miles from the tunnel portals, the company has designed two special dining car trains that carry hot meals in to the men working on the tunnel. A great deal of time is saved in this way and the men are not forced to go from the warm tunnel into the cold air at the surface during the middle of the shift.

The special dining car trains are made up of five cars, three of which are fitted with tables and benches, the other two being designed to carry the hot food into the tunnel. The food is transported in containers originally built for army use. These containers utilize the fireless cooker principle in keeping the food hot in transit. Two waiters accompany each train and take care of setting the tables and clearing them after the meal.

At present it would take the men away from their work for $1\frac{1}{2}$ hr. if they were to go to the surface for their meals. As the work progresses the time involved would be greater. Another advantage of the system employed is that the men are not subjected to the temperature changes during their shift.

Fourth Long Lake Unit Put in Power Company Service

The new 22,500-hp. hydroelectric unit of The Washington Water Power Company at Long Lake, Wash., has been completed and is now in service on the general system. The new unit is similar in capacity and general construction to three units heretofore installed at Long Lake. It will bring the Long Lake plant up to the ultimate capacity for which it was built, 90,000 hp. The contracts for the turbine water wheel and generator were awarded in December, 1922. The I. C. Morris plant of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pa., made the wheel and the General Electric Company, Schenectady, N. Y., built the generator.

Water is fed into the turbine wheel through a steel penstock 14 ft. in diameter. The generator is of 17,500-kw. capacity and is of the horizontal type directly connected with the water wheel. When operated at full speed the new unit will require 1,300 sec.-ft. of water under a head of 171 ft.

The new unit was primarily intended for reserve power and peak loads and the additional water needed in the season of low water will be drawn from the reserve supply in Long Lake. The installation was in charge of the engineering department of The Washington Water Power Company, headed by V. H. Greisser, chief engineer; R. L. Hearn, assistant chief engineer; H. L. Melvin, electrical engineer, and Eugene Logan, civil engineer.

Citizens of Anchorage, Alaska, coast terminus of the government's Alaska Railroad, are planning a \$450,000 hydroelectric power development on the Eklutna River, according to F. I. Reed, of Anchorage, and one of the promoters of the enterprise. The sum of \$100,000 has been subscribed toward the development, Mr. Reed has stated. The site of the proposed plant is 25 miles from Anchorage, where it is believed 25,000 hp. can be developed. A plant with 2,000-hp. capacity is planned.



Mid-shift meals are served to Florence Lake Tunnel crews from dining car trains brought to within a short distance of the tunnel heading.

Hollywood Electric Home Opened to Public on Feb. 28

The new electric home at Hollywood, Calif., which embraces the very latest in modern electrical home construction, was opened to the public on Feb. 28 and will be open until March 16 from 2 to 10 p.m. daily. The home is located on Cahuenga Avenue, just under the cross made famous by the Pilgrimage Play. It is of the picturesque type seen along the Riviera in France.

The home was built by Reed & Company, architectural designers and builders; completely furnished by Barker Brothers and wired by H. G. Stone, under the supervision of the Los Angeles Electrical Contractors' and Dealers' Association.

The Hollywood electric home is one of individuality, attractively designed, artistically planned, uniquely arranged and completely equipped electrically. It has become an accomplished fact through the desire of the electrical industry to acquaint the public with the proper methods of wiring a home, with the end in view of lightening the household tasks by the proper application of electricity.

The Hollywood home, which is being displayed under the auspices of the California Electrical Cooperative Campaign, has some fifty of the most practical, useful and modern electrical appliances. It is expected that some seventy-five to one hundred thousand



Electric home at Hollywood opened Feb. 28.

people will visit the home during the period it is open for inspection.

A large amount of publicity has been given to the home by the newspapers of southern California, due to the efforts of the committee in charge. Many original "stunts" were presented by the committee during the time that the house was under construction.

Big Creek 8 Service Restored by Speedy Penstock Repairs

One of the advantages of an extensive power system was illustrated effectively by the recent accident at the Big Creek No. 8 plant of the Southern California Edison Company when a 30,000-hp. hydroelectric unit was unexpectedly out of service about two weeks without causing any inconvenience to consumers. In fact, very few consumers even knew that the system was meeting any unusual condition. Another feature of the incident reflecting creditably on the company is that in this emergency of a high head penstock broken in two places a means of permanent repair was devised, the necessary pipe was manufactured, delivered to the plant up in the mountains 250 mi. from headquarters, and installed so that the plant was again in service within 14 days after the break.

The breaks in the pipe were caused, not by defective materials or workmanship, but by an error on the part of the operator which caused the Johnson valve to slam shut, setting up a severe water hammer in the 2,800-ft. penstock. Two ruptures occurred in the penstock, one about one-fourth of the way up and the other in the anchor section just outside of the power house.

The upper break tore the pipe open for the length of one section, the rupture being on the opposite side from and parallel to the longitudinal weld and crossing the circumferential weld approximately at right angles. Just outside of the power house in one of the thickest sections of the pipe line, the penstock was cracked for a length of about 5 ft.

In repairing the upper break, the ruptured section was removed from the pipe line and a new section was brought from Los Angeles to replace it. The lower break was repaired by using a piece of metal, taken from the upper ruptured section, as a butt-strap. This butt-strap was bolted in place on the inside of the pipe and then welded at the edges.

Light Snowfall May Mean Water Shortage in Nevada

According to a report of the water observer at Lake Tahoe on the line between the states of California and Nevada, the snow level there now is at the stage that would be normal during June. There is a shortage of about 90,000 acre-ft. of water in the lake at the present time. The Truckee River General Electric Company, Reno, Nev., operating in the State of Nevada, has an agreement with the U. S. Reclamation Service whereby it is to receive 500 acre-ft. of Lake Tahoe water from March 1 to Oct. 1. Unless heavy storms set in soon, reclamation service officials are doubtful whether it will be possible to live up to the agreement, recent press dispatches state.

Reports are also to the effect that the Lahontan reservoir now holds 203,000 acre-ft. of water, so that no shortage is anticipated around Fallon, Nev., or the lower end of the Lahontan Valley. Owing to the scarcity of snow at the headwaters of the Carson and Truckee Rivers, however, the prospect of a water shortage in the districts above the Lahontan reservoir is more serious.



Valentine display window of the Public Service Company of Colorado. The display, which was installed by Allen B. Spencer, attracted a large amount of attention in Denver.

Public Speaking Training Given to Utility Employees.

A public speaking class for public utility employees has been organized by the Rocky Mountain Committee on Public Utility Information. Under the direction of a special sub-committee, a number of the members of which have been attending a series of professional instructions, arrangements for holding the class have been completed for a course lasting until the early summer.

The first meeting was held early in February with thirty utility men in attendance. Since that time the membership has been increased to fifty, according to George E. Lewis, secretary of the committee. Representatives of the street railway, telephone, the gas and the electric company are attending regularly, his report indicates.

The primary purpose of this activity is said to be preparation of material and qualification of speakers who may be called on any time to represent their respective companies or give a talk on some phase of utility service or operation. A series of five prepared talks are given at each of the meetings.

Inventor to Demonstrate Color Organ in San Francisco

The first public Pacific Coast presentation of the Clavilux, the color organ invented by Thomas Wilfred, will be made in the ballroom of the St. Francis Hotel in San Francisco on the afternoon and evening of March 15. A preview, at which some of the technical features of the device will be explained, has been arranged for March 13 at the Lane Hospital. The presentations will be made under the auspices of the National League for Woman's Service.

The instrument that Mr. Wilfred has invented is an optical and electrical device that blends the qualities of light and color, pouring these effects upon a screen in a rhythmic manner. The Clavilux is either played by the use of a specially prepared score or notation, or the effects may be improvised.

A keyboard, similar to one used by an organist, provides means of controlling the light that is projected upon the screen. Mr. Wilfred will operate the Clavilux at all of the recitals.

Two Permits for Power Projects Issued in California

Thirty-three permits to appropriate water in the State of California were issued by the Department of Public Works of that state during January of 1924. Of this number only two covered applications relative to power developments. The larger one of these projects is that of the Excelsior Water & Power Corporation, Smartville, Calif. The permit that was issued to the company allows the appropriation of 25 sec.-ft. of water from the South Yuba River in Nevada County. The company proposes to develop 2,078 hp. at an estimated cost of \$204,590.

During the same month thirty-nine applications for water rights were filed with the department. The Bear River Water & Power Company, of Auburn, is the only applicant that desires to use water for power purposes. This company desires to appropriate 250 sec.-ft. and 100,000 acre-ft. of water from Bear River in Placer and Nevada Counties. The proposal is to erect three power houses to develop 42,994 hp.

Books and Bulletins

HYDROELECTRIC POWER STATIONS

By DAVID B. RUSHMORE, consulting engineer, General Electric Company, and ERIC A. LOF, engineering department, American Cyanamid Company. 830 pages, 437 illustrations. 6 x 9 in. Cloth, \$7.50. John Wiley & Sons, New York, N. Y.

The second edition of this excellent book deals with the development of our water power. The authors have recorded the rapid advance of hydroelectric development and have treated the subject from a practical and up-to-date engineering standpoint. In the preface the authors state that the increased size of the typical modern power development calls for the adoption of an entirely new point of view in the consideration of the economic problems involved.

In a book covering so large a subject in which the design, construction and

operation of hydroelectric properties are treated, it is impossible to discuss all of the various phases in detail. However, a sufficient amount of data and descriptive matter is included to give a good basis for a study of practically all of the subjects involved.

Starting with the history of water power and electrical developments and the water power of the world, with a short section devoted to the commercial opportunities for hydroelectric power, the book covers the hydraulic side of the subject with chapters on hydrology, dams and headworks, water conductors and accessories, storage reservoirs, power house design, and hydraulic equipment. Such modern developments as the spreading and hydracone types of draft tubes and the propeller type of turbine runner are treated briefly and the illustrations with their descriptions show the application of the most up-to-date hydraulic equipment.

The electrical equipment treats the subjects of synchronous and induction generators, exciters, voltage regulation, transformers, current limiting reactors, switching equipment, over-voltage protection and station wiring. The authors call attention to the fact that the construction of larger units year by year has led to radical changes in the design of rotating machinery and transformers. Also, the concentration of immense amounts of power has created a demand for more rugged switching equipment capable of rupturing enormous short-circuit currents.

The use of relays and relay schemes for the purpose of isolating a short-circuited, or grounded piece of equipment, or a transmission line, and thus maintaining the continuity of service to the remainder of the system, has progressed rapidly during the past few years. This subject of protective relays and their application is treated somewhat at length, thirty-nine pages being devoted to it. The application of current limiting reactors and the latest type of lighting arrester equipment is also described quite thoroughly for a text of this nature which must of necessity cover so many subjects.

The last two chapters of the book treat of the economic aspects of the development of water power and in a brief way, of the organization of the operating force and the methods of operating a hydroelectric system.

Thirty-one pages are given over to an appendix covering physical data on systems above 66,000 volts, the Federal Water-Power Act, and the turbine testing code.

This book is a valuable addition to the literature of hydroelectric development. It is well written; the illustrations are good, and it is as up-to-date as it is possible for a text to be which attempts to cover this rapidly growing scheme of controlling the forces of nature. As a supplementary text to students of civil and electrical engineering, and as a reference book for practical engineers, managers, and operators of hydroelectric properties, the book should be of considerable service.

E. R. S.



Thomas Wilfred, inventor of the Clavilux, seated at the keyboard of the color organ.

The Western Electric Company has issued a new folder descriptive of its isolated lighting plant which is called the "Western Electric Power and Light Outfit."

Meetings

To Hold P.C.E.A. Convention at Coronado June 17-20

At the meeting of the executive committee of the Pacific Coast Electrical Association, held in San Francisco Feb. 15, preparations were made for the annual convention of the Association. The meeting was presided over by L. M. Klauber, president, with Samuel H. Taylor as secretary. Committee reports of a routine nature were read and approved.

S. J. Lisberger was appointed chairman of the convention papers committee with J. B. Black and R. A. Balzari as members. K. E. Van Kuran was appointed general chairman of the convention committee.

An innovation in former practice was provided through the appointment by the chairman and confirmation by members of the executive committee of a nominating committee, whose duty it will be to report nominations for officers to serve during the year 1924-1925. This committee consists of A. E. Wishon as chairman, and H. A. Barre, W. G. Vincent, E. O. Shreve and Clyde Chamblin. It is proposed that the committee will report to the general business session on the first day of the convention, rather than on the last day as heretofore in order that the incoming officers may familiarize themselves with the procedure and any matters of unfinished business, taking advantage of the contact with the outgoing officers before the convention period.

The committee also voted to hold another Western development conference similar to that at the general convention of 1923.

The executive committee has designated the Hotel Coronado, Coronado, as the place to hold the 1924 meeting, the time being June 17-20, inclusive. The Journal of Electricity was again designated as the medium in which the papers to be read before the convention will be published and distributed to the membership. The date for this publication has been set as June 1, in order to afford to the members ample time in which to study the papers and come to the convention prepared to discuss them on the convention floor.

Among those present at the meeting were L. M. Klauber, president, Frank A. Leach, Jr., S. B. Anderson, Samuel H. Taylor, J. B. Black, R. A. Balzari, C. C. Hillis, C. T. Hutchinson, S. J. Lisberger, Robert Sibley, J. F. Pollard and A. M. Frost. Committee chairmen R. E. Fisher, Al C. Joy and A. B. Carpenter also attended.

Electric Club of Los Angeles Elects 1924 Officers

At the annual election of officers of the Electric Club of Los Angeles held on Feb. 11 the following were elected: A. S. Moody, General Electric Company, president; F. E. Seaver, Los Angeles Gas & Electric Corporation, first vice-president; Ben G. Wright, Southern

California Telephone Company, second vice-president; L. E. Moselle, Bureau of Power and Light, third vice-president; S. W. Murray, Illinois Electric Company, secretary-treasurer; L. R. Ardouin, U. S. Steel Products Company, sergeant-at-arms. D. C. Casselman, Builders' Exchange; F. E. Geibel, Pacific Electric Railway; Ross Hartley, The Electric Corporation; Arthur Kelley, Southern California Edison Company; C. T. Smallcomb, electrical contractor; and A. B. Vandercook, Western Electric Company, were selected to serve on the executive committee.

The officers named above will take over their duties at the meeting of March 3 when R. E. Smith, the retiring president, and his board of directors leave their positions. The slate shown has only one officer who has previously served on the executive committee or as an officer. Ben G. Wright, manager of

COMING EVENTS

Pacific Coast Division Electrical Supply Jobbers' Association—

Quarterly Meeting—Del Monte, Calif.
March 6-8, 1924

Executive Committee, Commercial Section, Pacific Coast Electrical Association

San Francisco, Calif.
March 21, 1924

Engineers' Society of Pasadena—

Pasadena, Calif.
April 10, 1924

Wyoming Utility Association—

Annual Convention—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Division, National Electric Light Association—

Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Committee on Public Information—

Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

National Electric Light Association—

Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—

Absecon, N. J.
May 26-29, 1924

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 17-20, 1924

the Southern California Telephone Company, served as vice-president during the past year. All those who constitute the present board have been active in the affairs of the club. The new president, A. S. Moody, is local manager of the General Electric Company.

The Colorado Central Railways Company of Denver, Colo., has purchased a factory site in that city and commenced remodeling the buildings on it for use in the manufacture of railway cars and electric and steam railway equipment. According to Orrin Merry, president of the company, it is expected that about 300 mechanics will be employed within the next 60 days and that more than 1,000 men will be at work at the end of six months. The plant will be operated in conjunction with the American Railway Steel Corporation and the Missouri Car Company of St. Louis, Mo.

Tenth Annual Convention Held by New Mexico Association

Public relations was the chief topic of discussion at the tenth annual convention of the New Mexico Electrical Association at Albuquerque, N. M., Feb. 18-20. Seventy-five utility men, including a large representation from Colorado and Wyoming, were in attendance. The convention included a quarterly section meeting of the Rocky Mountain Division of the National Electric Light Association. Sessions were held at the Franciscan, Albuquerque's new million-dollar hotel. Arthur J. Prager, general manager of the Albuquerque Gas & Electric Company and a former president of the association, headed the entertainment committee.

J. H. MacMillan, manager of the Santa Fe Water & Light Company, was elected president for the coming year. Other officers elected were K. W. Kissick, manager of the Deming Ice & Electric Company, first vice-president; Frank Schram, superintendent of Roswell Public Service Company, second vice-president; and B. L. Wiles, Albuquerque Gas & Electric Company, secretary-treasurer. The new executive committee consists of D. E. Bent, Tucumari, A. J. Prager, Albuquerque, D. W. Morgan, Las Cruces, and the retiring president, E. A. Bradner, Las Vegas.

San Diego, Calif., Electric Club Appoints New Committees

At a recent meeting of the Electric Club of San Diego, Calif., committees for the year were announced by the secretary, Guy Miller. The following chairmen were appointed: Wm. A. Cyr, program and publicity; W. H. Talbott, membership; A. E. Holloway, better business methods; C. C. Clardy, public education; Alex Schreiber, electric home; E. W. Weathers, better and more electrical farm equipment; A. E. Johnstone, better street lighting; Mr. Collins, better electrical wiring; F. R. Smalley, better street car cooperation; A. E. Holloway, better power company cooperation; Al Johnson, better telephone company cooperation; Thomas Howard, better army and navy relations; F. R. Smalley, relief.

The plan of giving over one meeting to each of the thirteen committees to present a program in conjunction with the work of that committee was outlined. P. P. Pine, retiring secretary and treasurer, in his final report described the growth of the club during the past year. The total membership is 120, of which 80 are resident members.

A week's exhibit by the Spokane (Wash.) Radio Association was brought to a close on Feb. 11. The exhibit was held in a prominent location in the business district, and was supplemented by window displays in leading stores. The association is endeavoring to raise funds for a broadcasting station.

At a recent meeting of the Engineers' Club of Seattle, Wash., Norwood W. Brockett, vice-president of the Puget Sound Power & Light Company of that city, addressed the members on the progress of hydroelectric development in the Pacific Northwest.

Manufacturer, Dealer and Jobber Activities

The Pittsburgh Transformer Company, Pittsburgh, Pa., recently secured through its agents, Eicher & Bratt, 570 Colman Building, Seattle, Wash., a contract to supply the Long-Bell Lumber Company, Longview, Wash., with the following transformers: three 2,000 kva., 66,000-13,200 step up; three 1,500 kva., 66,000-13,200 step down; twelve 833 kva., 13,200-230/460; three 500 kva., 13,200-115/230/460; six 100 kva., 13,200-115/230/460.

The Signal Fixture Company, Long Beach, Calif., has recently announced that the interest in the company owned by F. L. Lewis has been acquired by George H. Sanford. The concern engages in a general fixture and electric supply business.

Hobart Brothers Company, Troy, Ohio, has placed on the market a variable connector designed to permit users of constant potential battery charging equipment to vary the rate of charge. The appliance is equipped with an ammeter and a special carbon pile resistance unit. A dial control permits the operator to vary the rate of charge.

The Weaver Electric Company, of Denver, Colo., specializing in motor repair work, has been reorganized as the result of Mr. Weaver's death several months ago and is now incorporated under the management of J. N. Pizer and H. Goldberg. The business is still conducted at 1732 Wazee Street.

The Mountain Electric Company, Denver, Colo., is issuing in pamphlet form a series of "Monthly Sales Helps." Although primarily intended for the trade, the publication is of interest to purchasing agents and others, according to John J. Cooper, general manager of the company and former chairman of the Electrical Cooperative League in that city. The new booklet replaces the company's former house organ, "Mountain Breezelets."

The State Electric Company of Salt Lake City, Utah, has recently filed articles of incorporation in that state. The company will engage in electrical repair work and in the sale of supplies and fixtures in Salt Lake City. The officers of the company are: Rosena Moan, president; Gail M. Nielsen, vice-president, and Arthur F. Moan, secretary.

The General Electric Company has put on the market a new single-throw starting switch for use with small a.c. motors. This switch is of the three-pole type, designed for quick "make and break," and is operated by an up-and-down movement of the handle. Overload protection is provided by means of two thermal cutouts, one connected in each of two legs of the motor circuit, in order to protect all phases of the motor against unbalanced and single phase overloads, as well as overloads distributed over all phases. These thermal cutouts have an inverse-time characteristic and sufficient thermal capacity to permit the motor to operate at all overloads of short duration that are not objectionable from the standpoint of overheating the motor.

The Western Electric Company has announced that Frank H. Swayze has been made line material sales manager of the company. Mr. Swayze will have his headquarters at New York.

The Line Material Company, South Milwaukee, Wis., has just issued its sectional catalog No. 24 for factory distribution to those who are interested. The catalog is complete in detail and contains much useful information relative to pole line equipment.

The Progressive Electric Works has been organized in Los Angeles, Calif., to specialize in the installation of industrial and electrical equipment and in the repairing of heavy duty motors. D. M. Palmer is head of the new concern.

The Hisey-Wolf Machine Company, Cincinnati, Ohio, has issued Bulletin No. 3016-S which describes the company's new wide-swing floor stand grinder. The new grinder is equipped with an enclosed 3-hp. motor.



H. W. Young, president of the Delta-Star Electric Company, Chicago, Ill., manages to combine business with pleasure for he is here seen with Mrs. Young feeding the pigeons before one of the old Italian fountains in Venice.

The United Electric Company, Canton, Ohio, manufacturer of the Ohio cleaner, has announced that G. B. Stone has been appointed district manager of the company's Indianapolis, Ind., territory. Mr. Stone was formerly sales manager for the Ohio Tuec Company, Toledo.

The Robbins & Myers Company, Springfield, Ohio, has issued its fan catalog No. 1222. The catalog contains descriptive matter covering the company's 1924 line of electric fans. The booklet is well illustrated.

Roller-Smith Company, New York, has published Bulletin No. 400 (December, 1923). Description of the company's line of type TID and FID d.c. switchboard instruments is incorporated in the bulletin. These instruments are recommended for use where small sized instruments are preferable to the conventional 7½-in. types.

The Westinghouse Electric & Manufacturing Company, in cooperation with the Holophane Glass Company, has perfected a new type of refractor for use with street lighting equipment. The new device utilizes the principle of symmetrically distributing light which has already been employed in the Westinghouse highway lighting unit. Its purpose is to conserve the light from a Mazda C lamp which is normally sent out in all directions. The device, known as the Bi-Lux refractor, accomplishes this object by changing the direction of the horizontal light rays with a series of minute glass prisms so arranged that the light intercepted through an angle of 180 deg. is diverted in direction from the lighting unit at an angle that gives a maximum spread of light over the surface of the street. In shape the Bi-Lux refractor is a truncated hollow cone 8½ in. in diameter at the widest end. It consists of elements of clear pressed glass nested one within the other and firmly clamped together so as to form a single unit. On the inside surface of the outer piece and the outside surface of the inner piece are hundreds of small prisms arranged in two sets around the circumference of the refractor, at such an angle that the light rays will be bent in the desired direction. The result is that a 400-cp. lamp when used in the refractor will deliver a beam of 2,000 cp. in both directions up and down the street, 425 cp. across the street at right angles to the curb line, and 250 cp. in the opposite direction along the sidewalk.

F. Hackleman & Company, electrical contractors, Seattle, Wash., recently moved from the American Bank Building to larger and better equipped quarters at 2032 Westlake Avenue. Fred Hackleman heads the concern.

The Lemvig Electric Shop, Montebello, Wash., has been sold by H. L. Lemvig to C. N. Day and N. H. Wyn-dearo. The concern will be operated under the name of the Edison Electric Shop.

John Sidebotham, Inc., Frankford, Pa., has purchased the entire tape plant of the Belden Company of Chicago, Ill. The Sidebotham company specializes in the manufacture of all classes of electrical tape. The recently purchased Belden plant will be dismantled and moved to a site adjacent to the plant of the purchasing company.

Condit Electrical Manufacturing Company, South Boston, Mass., has published Bulletin No. 429-3. The bulletin contains descriptions of the company's line of type M-5 and M-6 manhole oil type switches.

Eldredge Electric Manufacturing Company, Springfield, Mass., has recently prepared an advance bulletin covering the new Eldredge solenoid relay that is designed for automatically controlling the lighting of safety traffic signals. The device is designed to light the traffic signals simultaneously with the series street lights. A magnetic relay is operated by the high voltage circuit, thus closing the circuit used for the street lights. The relay may be installed either above or below the surface of the street.

The New Italian Art Association, Ltd., London, has recently published a catalog covering alabaster lighting bowls and lamps.

Personals

William Baurhyte, since 1913 a vice-president of the Los Angeles Gas & Electric Company and since 1921 vice-president and general manager of that company, has been elected to the position of president, succeeding W. B. Cline. At the annual election of officers,



WILLIAM BAURHYTE

immediately following the annual stockholders' meeting, Mr. Cline announced his retirement as president and this action was followed by the election of Mr. Baurhyte. At the time he joined the staff of the Los Angeles Gas & Electric Company as second vice-president, more than twenty years ago, Mr. Baurhyte had already attained a conspicuous position in the public utility field. He remained as second vice-president until 1913 when he was elected vice-president. In 1921, on account of his special experience, he was made vice-president and general manager, which position he has since held. Mr. Baurhyte will be succeeded as general manager by A. B. Day.

O. L. Mackell, chairman of the Denver, Colo., Electrical Cooperative League, arranged an entertainment and smoker for the employees of the Public Service Company of Colorado, Feb. 21.

Perry B. Miller, of the Simplex Electric Heating Company, Cambridge, Mass., has been transferred to San Francisco, Calif., to succeed R. C. W. Libbey, resigned. Mr. Miller will cover the eleven Western states for his company.

W. H. Seaver, manager, U. S. Steel Products Company; S. B. Gregory of the Arrow Electric Company; Nathan Levinson, Pacific Coast manager, radio department, Western Electric Company; D. S. Spector of The Spector Company; B. M. Tassie, Pacific Coast manager, Manning-Bowman Company; L. O. Fassett, Radio Corporation of America, and W. E. Darden, Pacific Coast manager of the Prestolite Company, were among the members of the San Francisco, Calif., electrical industry who recently spent several days in Los Angeles, Calif., on business.

W. P. Schwartz, Pacific Coast representative of the Standard Electric Stove Company, Goshen, Ind., has just returned from a trip to the factory. Mr. Schwartz stopped at several points on the way and reports favorable business outlook for the year. Electric range factories have made arrangements for greatly increased output and even this increased capacity may not be sufficient to take care of the demand.

Percy Booth, Pacific Coast manager of the Edison Electric Appliance Company, Chicago, Ill., has just completed a trip to Seattle, Wash., Portland, Ore., and other Northwestern cities. Mr. Booth reports excellent business conditions prevailing and a splendid outlook for the year.

W. L. Rademacher, of the Edison Lamp Works, Harrison, N. J., spoke on "Modern Lighting" at a recent meeting of the Electric Club of Seattle. Faith Fairness, of the Seattle, Wash., Post-Intelligencer, spoke on "Electrical Problems of the Housewife."

Lester M. Holt, supervising engineer of the Indian Reclamation Service, Yakima, Wash., has been elected president of the Yakima chapter of the American Association of Engineers. John Sherman has been elected vice-president; Thomas Mead, secretary, and J. E. Forman and L. T. Jessup as directors for the ensuing year.

J. F. Pollard, vice-president and general manager of the Coast Valleys Gas & Electric Company, Salinas, Calif.; L. M. Klauber, vice-president and general manager of the San Diego Consolidated Gas & Electric Company, San Diego; A. M. Frost, manager of the consumers' service department, Southern California Edison Company, Los Angeles; Frank A. Leach, Jr., vice-president and general manager of the Pacific Gas and Electric Company, San Francisco; Samuel H. Taylor, secretary of the Pacific Coast Electrical Association, San Francisco; J. B. Black, vice-president and general manager of the Great Western Power Company, San Francisco; C. T. Hutchinson, vice-president and general manager of the McGraw-Hill Company of California, San Francisco; C. C. Hillis, president of the Electric Appliance Company, San Francisco; R. A. Balzari, manager industrial division, Westinghouse Electric & Manufacturing Company, San Francisco; Robert Sibley, executive manager of the California Alumni Association, Berkeley; S. J. Lisberger, chief of the division of electric distribution and steam engineering, Pacific Gas and Electric Company, San Francisco, and S. B. Anderson, treasurer, Pacific States Electric Company, San Francisco, were among those present at the meeting of the executive committee of the Pacific Coast Electrical Association held in San Francisco on Feb. 15.

Burton Y. Gibson, Pacific Coast representative of the Walker & Pratt Manufacturing Company, Boston, Mass., is on an extended trip through the Northwest. While in that territory Mr. Gibson will stage an intensive sales campaign in several cities.

George Teague, of the Pacific Northwest Traction Company, Everett, Wash., has been advanced to the position of assistant superintendent of that company, succeeding C. C. Coates, who has been made superintendent of the Everett division.

E. D. Harrington, assistant manager of the elevator section of the industrial department, General Electric Company, Schenectady, N. Y., is in Los Angeles, Calif., on a business trip in the interests of his company. Mr. Harrington is making special tests and conducting special investigations on elevator equipment for the benefit of his department.

H. D. Hawks, an officer of the Anaconda Copper Mining Company, Chicago, Ill., recently spent several days in Los Angeles, Calif.

Waldo G. Paine was elected vice-president and general manager of the Spokane & Eastern Railway & Power Company and of the Inland Empire Railroad at the annual meeting recently held in Chicago, Ill. The local officials remain the same.

William G. Campbell, representative of the Central Tube Company, Pittsburgh, Pa., was a recent Los Angeles visitor.

Oliver B. Lyman, manufacturers' agent, with offices in the Call Building, San Francisco, Calif., has been appointed Pacific Coast representative for the American Copper Products Corporation, New York City, and for the British American Tube Company, Inc., the American offices of which concern are in New York City.

H. L. Stoner, one of the officials of the Utah Power & Light Company, Salt Lake City, Utah, recently spent several days in Los Angeles, Calif.

Roy W. Elliott, one of the executives of the Albert Sechrist Manufacturing Company in Denver, Colo., for 18 years, and secretary of the Electrical Cooperative League of that city, has entered the jobbing field through the organization of the Elliott-Schmidt Electric Supply Company. Mr. Elliott is a native of Laclede, Mo., and with the exception of two years spent in the elevator and mill business in Kansas City has had all of his business career in Denver with the Sechrist company. In 1905 he started as an apprentice in the shop and passed through all the mechanical departments,



ROY W. ELLIOTT

becoming superintendent of the factory. Later the order department was placed under his jurisdiction and then he became purchasing agent and sales manager. He succeeded the late Albert Sechrist as a member of the advisory board of the Denver league and was elected secretary of the organization in July, 1922, which honorary position he has held until the present time.

Philip F. Apfel, president of the Electric Heating & Manufacturing Company, Seattle, Wash., is in San Francisco, Calif., on business for his company. Mr. Apfel drove from Seattle and reports a very interesting and enjoyable trip. He is particularly enthusiastic about California good roads.

Mrs. Helen Grahame, of the California Electrical Cooperative Campaign, Los Angeles, Calif., recently spoke before the San Francisco Electrical Development League on the electrification of the home.

James Duncan, of the Mexican Light & Power Company, Mexico City, Mexico, is in San Francisco, Calif., on business for his company.

W. M. Birchfield of the Standard Electric Time Company, Springfield, Mass., was a recent visitor in Los Angeles, Calif., in the interests of his company. While there he was accompanied by W. S. Harrell, Pacific Coast manager of the company.

George E. Dawson, formerly of the supplies section of the publicity department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been transferred to the San Francisco, Calif., office where he is now assistant in the advertising department.

A. S. Moody, local manager of the Los Angeles, Calif., office of the General Electric Company, has been elected president of the Los Angeles Electric Club. Mr. Moody succeeds R. E. Smith, advertising agent of the Southern California Edison Company, Los Angeles, under whose administration the club made notable progress. Mr. Moody has been with the General Electric Company on the Coast for over sixteen years. He is a graduate of the University of California, class of 1906. In 1907 he was made sales engineer in the San Francisco, Calif., office of the General Electric Company, and in 1908 he was transferred to the Seattle, Wash., office of the company in a similar capacity.



A. S. MOODY

In 1910 he was made manager of the supply department of the Portland office and in 1920 he was appointed assistant Northwest manager with headquarters at Portland, Ore. Mr. Moody has been an active worker in association affairs and has held office in the Northwest Electric Light and Power Association and the American Institute of Electrical Engineers.

E. C. Portman, Jr., for over two years manager of the advertising service department of the Journal of Electricity, has resigned to become affiliated with the American Seedless Raisin Company. Mr. Portman's headquarters will be in San Francisco, from which point he will cover the entire United States.

John E. Loiseau, secretary of the Public Service Company of Colorado, Denver, Colo., was awarded the prize in a recent contest conducted by his company in Denver to originate a new name for the plots of land on which some gas holders and electric substations are located in various parts of the city. He suggested the name of "service reserve."

Mrs. Alma E. Hunt, for some time the range and cooking specialist of the Southern Colorado Power Company, Boulder, Colo., has become a special demonstrator for the Edison Electric Appliance Company in the mountain region, under the direction of B. E. Rowley, district manager of the company.

Ernest Stenger, receiver of the Denver, Colo., Tramway Company; J. C. Burger and Clare N. Stannard of the Public Service Company of Colorado, Denver, Colo.; W. P. Southard of the Trinidad, Colo., Electric Transmission, Railway & Gas Company; Fred Norcross of the Home Gas & Electric Company of Greeley, Colo., and J. A. Clay of the Western Colorado Power Company, Durango, Colo., are among the electrical and utility men named on the state-wide committee for the Golden Jubilee to celebrate in 1926 Colorado's fiftieth anniversary.

A. A. Wilson, formerly general agent of the Chicago, Milwaukee & St. Paul Railroad at Denver, Colo., has been appointed traffic manager of the Salt Lake & Utah Railroad, with headquarters at Salt Lake City, Utah. Mr. Wilson succeeds A. V. Kipp, who resigned last October to become assistant general freight agent of the Oregon Short Line Railroad. Mr. Wilson has been identified with the Chicago, Milwaukee & St. Paul Railroad for the past twenty-seven years, and has worked in various capacities in the traffic department. He began his railroad career as a telegraph operator, worked up to division freight and passenger agent in Iowa, was then promoted to assistant general freight agent at Chicago, and then to general agent of the line at Denver.

L. A. S. Wood, manager of the street lighting department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just completed a trip to various Pacific Coast cities. Mr. Wood is chairman of the street and highway lighting committee of the National Electric Light Association.

Fred Todt, manager of the San Francisco district of the Pacific States Electric Company, San Francisco, Calif., and C. W. Goodwin, Jr., of the credit department of the same company, recently spoke before a meeting of electrical dealers of the San Joaquin Valley, held at Tulare, Calif.

Lewis A. Lewis, sales manager of The Washington Water Power Company, Spokane, Wash., has attended a committee meeting of the Northwest Electric Light and Power Association held at Portland, Ore. This meeting discussed at length the electric range situation in the Northwest.

Robert K. Brown, superintendent and chief engineer of the Salt Lake & Utah Railroad Company, Salt Lake City, Utah, has been elected president of the Engineering Council of Utah, to succeed Dr. Joseph F. Merrill. The Engineering Council of Utah is composed of representatives from all societies of professional engineers in the State of Utah. Mr. Brown is a graduate of Rensselaer Polytechnic Institute, class of 1888, in civil engineering. His first position after leaving college was with the Pennsylvania lines in maintenance of way and construction engineering. After ten years of service with the



ROBERT K. BROWN

Pennsylvania he became associated with the Los Angeles and Salt Lake Railroad in maintenance and operation, with headquarters at Los Angeles, Calif., and later at Salt Lake City. His connection with this road extended over a period of seventeen years. During the past five years he has filled his present position of superintendent and chief engineer of the Salt Lake & Utah Railroad, an electric interurban which runs between Salt Lake City and Payson, Utah, and also known as the Orem Line. Mr. Brown was president of the Utah Society of Engineers for some time, and has been on the executive board for many years. He is at present treasurer of this society and is still a member of the executive board. He has been on the governing board of the Engineering Council of Utah since its organization, and was also secretary of that organization until about a year ago. He has been a member of the American Society of Civil Engineers for the past thirty years, and also has been a member of the American Railway Engineering Association for a great many years.

W. G. Grady, of the auditing department of the Edison Lamp Works, Harrison, N. J., has been spending some time in the San Francisco district of the company. He will return to the factory within a few days.

W. R. Mathews, electrical engineer of The Washington Water Power Company, Spokane, Wash., is spending some time at the Edison Lamp Works, Harrison, N. J., studying illumination engineering.

Norman Begg, of the Mexican Light & Power Company, Mexico City, Mexico, is spending some time in San Francisco, Calif., investigating central station practice.

Trade Outlook

San Francisco

General business conditions continue good, with notable improvement in many lines. Recent rains have materially improved conditions in the country, and the water supply has been benefited, storage now approximating normal.

Building activity continues, and the demand still exceeds the supply. This results in an exceedingly heavy demand for electrical construction materials. Appliances are also in strong demand, and on some lines deliveries are more than thirty days behind orders.

Credits are easy and collections are generally good. There is still plenty of money available for proper business development activities, and interest rates are normal.

Recent advances in the price of oil have tended to increase general business volume in oil-producing territory. Owing to the raise in the price of oil, the rates for manufactured gas have advanced, and this is expected to be reflected in the increased use of electricity for manufacturing and domestic purposes.

Portland

The building trades have had the most active winter season in years. With only short interruptions the weather has been favorable for out-of-door work. As a result there has been practically no unemployment among the skilled workmen and very little of any kind. The residence building of last year, although the greatest ever known here, did not keep pace with the growing population. Vacant houses are very scarce and rents high. Everything points to tremendous activity in all types of building construction in the near future. Residence permits for January, 1924, were 60 per cent over the figure of a year ago.

There has been some falling off in lumber orders. The output is still heavy, however, the surplus being used to replenish stocks which were low. There has been some cancellation of orders and disappointment that the Japanese buying was not maintained, but all this is considered but a temporary off-season lull. An increase in freight rates to Atlantic ports has reduced the volume of business somewhat.

Los Angeles

General business conditions in Los Angeles are somewhat improved over the conditions prevailing during the previous two weeks, which is due in a measure to the influx of Eastern visitors. Practically every hotel in the city is full. This makes for brisk trade in mercantile institutions and, in fact, in all lines of business. The increase in traffic on the electric railways, due to tourist travel, is particularly noticeable.

The electrical industry is reacting to general trade conditions, and the retail end of the business reports very fair results for this season. Wholesale and

manufacturing branches are keeping busily occupied filling orders that are coming in.

There is a slight excess of labor at the present time.

Building construction continues to run well ahead of last year. Permits issued during the first two weeks of February amounted to 2,916 with a valuation of \$9,210,287, as compared to 2,202 with a valuation of \$6,409,574 for the corresponding period in 1923.

Salt Lake City

The recent rise in silver and lead prices, although comparatively small, is welcome news to the mining industry of this section. Practically all the mining camps are prospering, and that prosperity is reflected in general business conditions. Even though copper is at a rather low figure, the Utah Copper Company is operating at very nearly normal capacity, and there appears to be no indication of any unfavorable change in this situation.

Farmers of Utah and Idaho are well pleased with the sugar beet contracts which have been entered into with the sugar companies for 1924, and increased tonnage is looked for this year.

Employment conditions are better than for several winter seasons past. The usual winter curtailment, other than seasonal, is not so pronounced. Most of the existing small surplus of labor will be absorbed within a short time by building activity and resumption of work in the agricultural districts. Railway shops, which have been operating with smaller forces during the past two months, are gradually increasing their forces.

The month of March will witness greater activity than ever among the electrical dealers in devoting intensive efforts to washing machine sales. Due to the fact that general conditions are better than at this time last year, even better results are looked for than the very good showing made then.

Credit conditions and collections continue to improve.

Denver

Business in general, considering the season, remains good although the financial situation in various parts of the Mountain region is not encouraging. A number of smaller banks in Wyoming and New Mexico have been in difficulties, but the condition in most of the larger cities is healthy.

Building operations throughout the region have dropped off, due principally to the weather. The effect is apparent in the labor situation with the unemployment largely in unskilled lines. Present indications are that this is temporary, as a number of large building and industrial projects are planned for the early spring.

More and more emphasis is being given to Denver for railroad development, as indicated by improvements

made in the terminal and shop facilities of the principal lines entering the city. The new Burlington shops, additions to the Denver & Rio Grande Western and Colorado & Southern shops, a new freight house for the Union Pacific, and the establishment of a car foundry here are the major developments along this line in addition to the boring of the Moffat tunnel.

Kitchen lighting campaigns are helping to keep the electrical contractors busy, and a toaster campaign is being planned by the industry to stimulate interest in the appliance business during the temporary lull.

Spokane

With a very early spring already well begun, the outlook for better business in 1924 has brightened considerably. There is an increasing activity in building and real estate business with announcements of several new structures.

The local woodworking plants are operating at good output, several being on double shift and one plant on three shifts.

The packing plants are sustaining a level of production materially higher than that of last year, with indications for a good season.

Preliminary reports of the U. S. Geological Survey covering mineral production of Washington and Idaho for the year 1923 indicate that the metalliferous mine output of the former state, nearly all of which is produced east of the Columbia River, shows an increase of 100 per cent over 1922, and that of Idaho an increase of 50 per cent. The outlook at the beginning of 1924 is for increased production this year over 1923 in both of these states. Zinc production in the Coeur d'Alene district has been stimulated by the recent increase of 2c. in the price of zinc.

Seattle

Judging by the volume of building permits issued, spring construction activity is at hand, although the entire winter has been the most active in the city's history. A far greater volume of building in all lines is under way than for many years past, and prospects for the early spring are excellent.

Demand for schedule materials, better types of indirect fixtures, outlets, and all kinds of home equipment is very active. Increased commercial activities are creating new and growing demands for all forms of electrical equipment. With ample water fall to insure a plentiful supply of electrical energy the industry is expected to receive a real impetus in the Northwest.

Retail buying continues satisfactory in nearly every line, with the department stores and clothiers reporting a marked stimulus recently.

Stocks are reported to be in fair condition, with prices firm and collections satisfactory.

The lumber industry reports prices firm, with the Japanese credit situation showing improvement. Heavy export stocks of lumber are on the west coast, awaiting disposition. This is largely due to arrangements made by Japanese buyers for financing. Continued prosperity in the lumber industry is confidently predicted.

Journal of Electricity

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March 15, 1924

San Francisco



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The Fobes Supply Co., Portland, Ore.
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H. G. Overbeck, 3356 W. 31st Ave., Denver, Colo.

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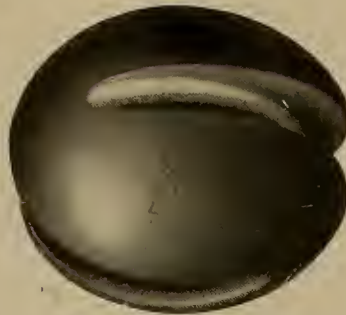
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Conduit and Armored Conductors
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Insulating Materials

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A Course in Accounting

ENDEAVORING to run a business without adequate knowledge of expenditures and income is a sure method of courting disaster. Starting with the April 1 issue, the *Journal of Electricity* will present a course in simplified accounting especially adapted to the needs of the contractor-dealer.

Mr. F. V. Mitchell, who has been secured to conduct this course, studied under the Walton School of Commerce at Chicago, Ill. He

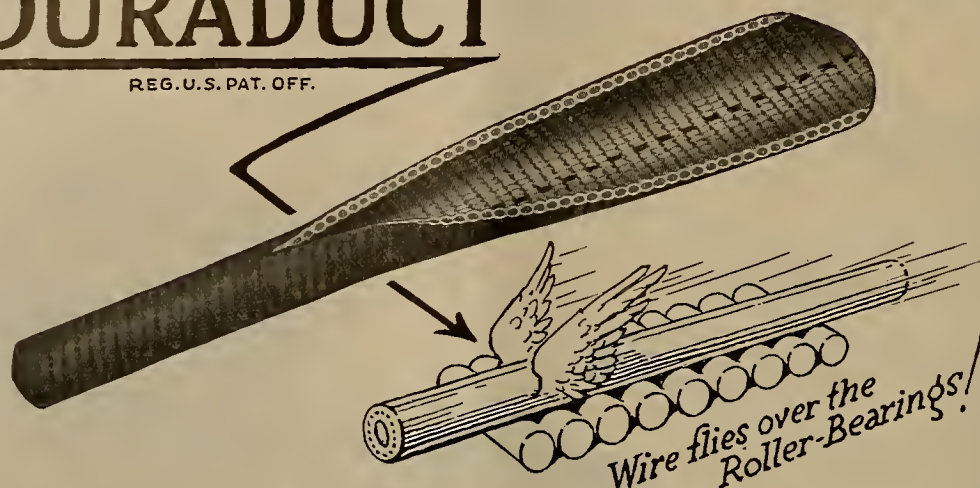


has had more than fifteen years of practical experience as a public accountant and has specialized in mercantile accounting. For the past several years Mr. Mitchell has devoted special attention to the matter of accounting as applied to the electrical business and especially as applied to contractor-dealers.

The series that he will present is based on his observations and experience in this work. It will be addressed to the special needs of the small electrical store and will provide the necessary information required to lay out a simple set of books that will meet the practical needs of the contractor-dealer. You will want to start with the first number and follow the course.

DURADUCT

REG. U.S. PAT. OFF.



Thousands of Contractors Have Discovered That Wire Slides Through Duraduct with Lightning Speed!

These live-wire contractors are way ahead of their competitors when it comes to doing a good wiring job in the shortest possible time.

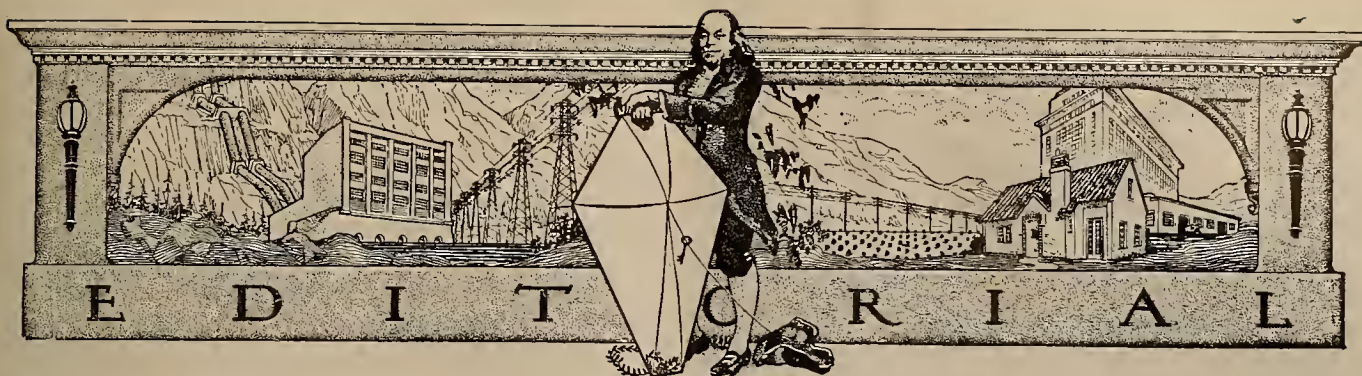
You know how it is when fishing a long length of ordinary loom. The waxed braid on the wire slides back, bunches up, clogs the tube; you do a lot of cussing, and finally pull the wire out, cut off the bunch, and start again nursing the wire through the tube.

That's where the user of DURADUCT gets the jump on his competitor. He can fish fifty feet as easily as five; and there's no pulling back the wire to get a fresh start. The roller-bearing wireway takes care of that.

Made at Pawtucket, R. I. by the

TUBULAR WOVEN FABRIC CO.

ALLIED INDUSTRIES, INC., Pacific Coast Representatives



A Public Service Conference

IT is a poor spirited young man who is forced to waste the moonlight of a summer evening in the unprofitable business of holding his own hand. The progress of the race—and his own suit—is furthered very little by ardent appeals heard only by the trees of the woods and his own ears. The first requirement of eloquence, if it is to result in matrimony, is an audience.

THE electrical industry has too often wasted its time in telling its own story to its own membership. A competent rehearsal is a fine and necessary preparation for the task ahead, but it is of little value unless the public performance actually comes off. This has been the theory back of the series of industrial conferences which, with more or less success, have concluded the program of the Pacific Coast Electrical Association conventions for the past few years. These meetings have been uniformly inspiring in the messages set forth, but not uniformly well attended by the industrial and business men of the community. Only a limited number of leaders of community thought can be personally conducted by their power company friends to these meetings—few otherwise take the time and undergo the expense to take in the meeting. The trouble is that they are not yet convinced of the vital common interest which exists between the problems of the electrical industry and their own—until they have once attended such a meeting, will probably not be wise enough to know that it would be worth their while attending one. This entertaining circle will

probably always stand in the way of success of such a conference; the business man can undoubtedly best be hunted in his own lair, at his own conventions and gatherings.

THERE is a group of allied industries, however, whose common interests and problems are so vital that they could with great profit foregather at some single rallying ground for the purposes of mutual education and inspiration. These are the so-called public service companies. The water company, the gas utility, the street car system, the railroads and the power company have common problems. Alike they serve the public and are in turn regulated by its delegated commissioners; they face the same problems of maintaining satisfactory public relations and they suffer in the same way under the attacks of socialistically minded demagogues. When the existence of one is attacked, the safety of all is threatened. The factor of self-interest of each of these industries in the present day problems confronting them all is so great that they would without question welcome the opportunity to participate in what might be called a "Public Service Conference," sending delegates and assisting in the formulation of a program of action to safeguard their common interests. The first step of the electrical industry in facing the struggle before them during the coming year should be to enlist the active assistance of their natural allies. Why should not such a conference form the major feature of the 1924 convention of the Pacific Coast Electrical Association?

A Definite Step

Toward Better Merchandising

THE electrical contractor-dealer has become a fixed institution. He is a very necessary economic factor and has a well defined place in the general scheme of business. This being established as a fact, it seems only good judgment to make sure that the contractor-dealer perform his function with the greatest efficiency. At the present time the selection of those who enter this field and their education in the business of serving the public is left almost entirely to chance and the hard knocks of the school of experience. It may not be impossible to take a lineman or a wireman and make of him a successful merchant, but the obstacles now existing in his way certainly retard his progress. And this retardance works to the disadvantage of the entire industry. Also, while the electrical dealer of this type is learning his trade, but not yet the master of it, the hardware merchant, the furniture trade and the department store, with merchandising experience alone, are entering and exploiting a field known for its technicalities. In a measure, it is like giving a child a delicate watch, a hammer and a screw driver and then expecting him to make of himself a watchmaker.

Would it not be better for the industry as a whole to combine on a comprehensive program, so prepared that it could be available to all, and then to see that all concerned were included within its scope? Sales would be more intelligently made, made with an understanding as to the customer's demands; wiring would be planned and executed for real convenience; manufacturers and all electrical merchandisers would benefit in volume and the consumer would really enjoy the comforts of electrical service.

Public Contact from

the Woman's Standpoint

WOMEN'S votes have been looked upon of recent years with great respect by candidates for office—the woman's vote in the home is certainly the deciding factor in determining household policies. It might be of interest to consider what recognized methods of obtaining the woman's good will have been adopted by the electrical industry. She has been reached through newspaper and billboard advertising, she has been circularized, she has been visited by salesmen at the front door. Lecturers have addressed her clubs; they have also addressed her husband and left him to carry his own message, such as it may be, to his better half. The one thing that has not been done is to approach the woman on her personal side.

One of the most successful ways of reaching the good opinion of the average man is to make a personal friend of him. For this reason, the business man joins clubs and eats lunch in public—or golfs on a pleasant Thursday afternoon in the presence of his fellows. Why should not the women of the electrical industry similarly add their names to the membership roll of women's organizations and take

part, at least so far as business hours will permit, in their activities? The usual woman's club holds afternoon meetings which would break badly into an office day, but these same organizations often have special sections for the study of civic and home problems which would welcome the services of a "business woman" trained in matters of special electrical interest and which meet at the convenience of their particular members; there are also luncheon and evening clubs among the women. The Women's Public Information committee of the Pacific Coast Electrical Association has recommended the greater participation of the women of the electrical industry in civic affairs. It is the part of the employers of these women to make such participation possible.

The Growing Interest

in Electric Refrigeration

ELECTRIC refrigeration in the home formed a major topic of discussion at the recent convention of the Mountain States Ice Manufacturers' Association at Denver. They considered the widespread interest being shown in this most recent addition to electrical labor-saving devices to be a distinct menace to the supremacy of the iceman and by way of a counter attack, considered ways and means of improving their own service.

This is merely one symptom from the many which indicate that home refrigeration has advanced from the experimental class and is being generally accepted as an important factor in modern home comfort. In the Northwest, one of the larger power companies has organized a system of education for their salesmen in the selling of electric refrigerating machines; two California power companies have already added this appliance to their schedule of equipment to be pushed. The West was the first section of the country to introduce electric ranges on a large scale—the wide interest being shown in electric refrigeration indicates that it is now considering the possibility of taking a pioneer part in this field.

The Matter

of Margins

A favorite complaint of the retail merchandiser in the electrical field is that the margin of profit allowed him between the wholesale price and the figure at which he must sell his goods to the consumer is too small. It is the exceptional man who confesses that in spite of the handicap, he is able to make a living at the work—and even this exception in most cases will admit that it is only through his unusual enterprise and skill that he thus succeeds in making the proverbial two ends meet.

On another page of this number, Mr. Kincaid has made a masterly analysis of the present contractor-dealer problem. He will follow it up in the next issue with various concrete suggestions as to what might be done to better the situation. Among other aspects of the problem, he takes up in this issue the subject of margins and he brings out very clearly the mistake in the popular attitude in this matter.

Without discussing the mathematical point at which a margin should be fixed, he points out that from every standpoint, it is undesirable to make the merchandising of electrical equipment so attractive that anyone could make a profit in the business. This would multiply the confusion by attracting the ignorant and incompetent to the field, resulting in turn in cut prices and in a smaller profit for all concerned. The salvation of the system is to weed out all but the better types of merchant, gradually making the electrical contractor-dealer the specialist which he should be and a really satisfactory outlet for the electrical trade.

The Way to Get Something Accomplished

WHEN Los Angeles wanted a harbor, a group of Los Angeles men got together and after discussing the needs of the situation, subscribed \$200,000 on the spot to study the problem. The port of Los Angeles is now one of the features displayed with the greatest pride to visiting tourists.

The Sacramento Valley is now in need of a unified development of the Sacramento River to meet the requirements of flood control, shipping, irrigation and power. There is a tendency among those most concerned in this problem to hold meetings discussing its various phases and then to leave matters, in the hope that a state commission will be appointed in the wisdom and good time of an all-wise Providence and the governor, which will look into the matter and actually devise the working plan necessary to go ahead.

There are large business interests in the valley, however, whose welfare is endangered so long as this problem remains unsettled, who are not satisfied with the outlook for accomplishment under this program. They would like to see something done and they are willing to follow the Los Angeles example by digging down into their pockets in order to appoint their own engineers to analyze the situation. They believe that as soon as the valley actually knows what it wants, what is advisable and what is feasible, the concrete carrying out of the plan will be a straightforward and comparatively simple matter. So long as they continue to talk—and to wait for the state to make the investigation—nothing very much will happen. The old adage still holds. The way to get something done is to do it yourself.

No Justification for Cut-Price Merchandising

VARIOUS branches of the electrical industry gaze with varying thoughts upon the efforts of central stations to perform a merchandising function. Some feel that the central station is in a particularly fortunate position for the performance of this sales service and that, inasmuch as service is the real key-stone of merchandising, they should actively engage in retail sales effort. Others feel that the field of merchandising should not be entered by others than those whose business is solely the performance of a

dealer's function. Probably the best answer to the problem is to be found in those sections of the country where power companies have for years maintained a retail sales department. An analysis of the general retail merchandise conditions in those sections, reflecting either success or failure of utility merchandising programs, will serve to prove the contentions of one side or the other.

There is, however, one practice, not uncommon in central station merchandising programs, that appears to be unsound and that should consequently be discouraged. There seems apparent no reason why a central station should sell merchandise, no longer in the pioneering stage, of known quality and of established price, for less than the manufacturer's list price. To do so is destructive in every way. The consumer, instead of feeling that a bargain has been obtained, feels that the original price was too high and that an undue profit was being exacted. Dealers, who because of lesser buying power and other reasons, are unable to meet this sort of competition—which is really not competition—are placed in an unfair position before the buying public, and manufacturers' sales are impaired because of the unsavory reputation that generally attaches to a cut-price article. The plan of cutting prices is destructive and not constructive and as such should be discouraged.

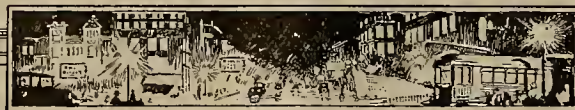
Make the Smiles Campaign A Company Policy

EVERY company has a certain code of procedure which is explained to each incoming employee and which he must learn before he can become a full-fledged citizen of his new job. This covers a wide field, as a rule, from such practical matters as where you hang your hat to the policy of the company in dealing with its competitors. Quite as important as the knowledge of how long is allowed for lunch, however, is the initiation of the new man into the spirit of the electrical industry. And that spirit is best exemplified by the aims and principles of the "Smiles" movement.

It should be understood that no man goes on the salary roll of a power company, electric jobbing house or contractor-dealer until he has had explained to him the idea back of the little red button and until he has signed his name on the dotted line as a life member of the Courteous Service Club.

This movement was started by the Pacific Coast Electrical Association and temporarily the supply of buttons and cards is limited to the territory covered by that organization. It is too good an inspiration to stop here, however, and the other sections of the western region have already taken it up. It has, indeed, been receiving national publicity and there is every evidence that this epidemic of smiles will become a national affair. When the initiation of every new employee into the electrical industry the country over includes a training in the spirit of courtesy, there will no longer be any problem of good will to consider. The public will be smiling back.

CURRENT COMMENT



Industrial democracy is heralded by the Seattle Post-Intelligencer in an editorial which commends the employee-stock selling policy of Armour & Company.

The editorial is as follows:

A Parallel in Public Ownership

Ten years ago the great house of Armour & Company was a private corporation. All of the stock was owned by members of the Armour family. Is it a private corporation today?

Today it has seventy-seven thousand stockholders. Of these, forty thousand are employees of the company who have invested their own savings in the business.

Moreover, the company is owned in small blocks. There are seventy thousand stockholders owning less than twenty-five shares.

An interesting process of transformation.

A hundred and fifty years ago this nation taught political democracy to the world—the passing of power from a king to a legislature of the people.

Are we to teach the world industrial democracy as well—the passing of ownership and power from a few kings of finance into the hands of thousands of citizens, the new owners and masters of business?

Some day the forty thousand employee-stockholders of Armour will be doubled. Some day the workers will own not half, but all the stock of Armour and thousands of other big industries.

Thus, without bloodshed or revolution, the goal of industrial democracy will be won.

Under the title "Real Public Ownership," the Washington Committee on Public Utility Information gives some figures on the policy of the Southern California Edison Company:

Ten years ago the Southern California Edison Company was a comparatively close private corporation, a few individuals owning all the stock.

Is it a private corporation today?

It is not. Today it has \$67,000 stockholders, 90 per cent of whom reside in Southern California, and of which 4,500 are employees.

Moreover, the company is owned in small blocks, as may be seen from the fact that over 39,762 have an average investment of \$300 each; 12,462 have an average investment of \$500 each; 5,900 an average investment of \$1,000 each; 4,750 an average investment of \$1,500 each; 1,450 an average investment of \$2,500 each; 673 an average investment of \$5,000 each, etc. Of the 67,000 stockholders approximately 38,000 are men, 27,000 are women, 1,500 children and 500 estates.

This is an interesting process of transformation, which compels us to ask:

Are we to teach the world real public ownership—the passing of ownership and power from a few kings of finance into the hands of thousands of citizens, the new owners and masters of business?

Some day the number of customers and employee stockholders will reach 100,000 and that not far distant, as the company is adding about 1,000 new stockholders per month.

Thus without bloodshed or revolution the goal of real PUBLIC ownership will be won.

Is there not a real parallel between the two cases?

Within the past month a scholarship prize of \$1,000 has been offered by the Northwest Electric Light and Power Association for the best essay written by

a high school student in the State of Washington on the subject of "State Regulation of Public Utilities." The proposal was approved by E. V. Kuykendal, director of

the state department of public works, who states that he has long believed that the subject of state regulation should be a subject for school study, and was accepted by Mrs. Josephine C. Preston, state superintendent of public instruction. When it reached Seattle, however, the county superintendent of schools refused to admit King County students to the contest, on the ground apparently that thought on this subject would be likely to prejudice the student against public ownership. The controversy has furnished material for a fiery exchange of compliments between the Seattle Post-Intelligencer and other newspapers. A recent full-page editorial from the Bellingham Labor World entitled "A Class in Truth, Justice and Public Service" deals lightly with the evidence as presented to date:

Today, having in mind a thought for the welfare of ambitious youth struggling for education, we call the class to order and likewise call the roll:

"A. S. Burrows, King County Superintendent of Schools!
"Howard Fisher, Pierce County Superintendent of Schools!

"J. Newton Colver, Seattle Post-Intelligencer staff!"
All present! Be seated, gentlemen.

* * *

We trust that you are here with open minds; that none of you contemplate running for some new political office and that nothing is further from your inmost heart than to seek personal advancement at the expense of sons and daughters of workmen of Washington. Because—we can do no better than quote one of Mr. Colver's interesting news reports—"It has long been a rule that the schools are not to be open for any group or institution seeking to serve a selfish or personal end."

We mention this, not through any desire to offend—rather it is our aim that this morning's class shall seal a friendship and not engender hatred—but because it has been hinted, of course by those who know no better, that certain of the students present today aspire to state preferment and conceive this to be an opportune moment to "jump on the band wagon," to use the vulgar parlance of the hoi polloi.

* * *

What we have immediately in mind for discussion is the proposed disbarment of high school students of King and Pierce counties from an essay contest, the subject being "State Regulation of Public Utilities" and the prize a \$1,000 scholarship.

Will Mr. Burrows kindly stand up!

Now, Mr. Burrows, you have stated your position in this matter: "I noticed that there was no bibliography offered or pamphlets to be furnished by the state school superintendent on the public ownership side of this question."

And it is for this reason, we presume, that King County boys and girls are to be disbarred.

This analysis of the situation is hardly up to the scholastic standards of the state and we can grade it little higher than "Z"—"Y" possibly, but no better.

Publicly owned utilities, Mr. Burrows, are not subject to state regulation. In what way, then, is a student to introduce a mythical condition into a thesis of business facts and concrete problems? Where, indeed, is he to gather his data on something that does not exist, unless possibly, it be from the soaring imagination of the Post-Intelligencer?

It may be that you have in mind the NECESSITY of state regulation of publicly owned utilities, desiring common justice for private companies, protection for their investors and a better service for the public, but if this be the case we hardly believe that your attitude would meet with the unqualified approval of Mayor Brown, Councilman Erickson, J. D. Ross, Homer T. Bone and various other illustrious names in the municipal field.

We have no desire to be harsh with you, Mr. Burrows, but we must insist upon an application of common sense to the problems of the day and we expect better things in the future.

Be seated.

* * *

Stand up, Mr. Fisher!

The manner in which you have worked out this problem, Howard, is positively disgraceful and shows an incredible failure to grasp the very first principles of the issue at stake. We will, therefore, refrain from embarrassing you by grading it at all for the reason that the alphabet stops at "Z" and we have not yet heard today how far below that the German mark is quoted. We take it that you want to know:

"If a student wrote a contest essay attacking private ownership and favoring public ownership, would this association . . . give him the \$1,000 scholarship?"

No, Howard, it wouldn't.

Nor yet would it award him the scholarship were he to write an essay attacking public ownership and favoring private ownership. Nor yet, again, would he receive the scholarship for a dissertation upon the best method of extracting sunbeams from cucumbers, regardless of the beauty of his rhetoric, the elegance of his diction, the grace of his literary style.

No, strange as it may seem to you, Howard, he would receive the scholarship for none of these efforts for the obvious reason that none of them are designated as the subject matter of the contest, and it still remains a deplorable fact in these degenerate days that the man who pays the piper has the right to call the tune.

We are sadly disappointed in you, Howard, be seated and try to do better or we will be forced to report you to your parents.

* * *

Mr. J. Newton Colver, stand up, please!

Take that smile off your face, Newton, we've had about enough buffoonery for one day and, besides, we rather suspect that you have hocus-poccused these two boys and let them in for all this mess and trouble. We don't want to see it happen again or we'll certainly talk to Mr. Hearst about it.

We have right here your little essay, "The Seattle Post-Intelligencer" of February 22. It is very good indeed in point of diction, style and spelling but it does not seem to make sense at all. Here, for instance, is a heading: "Power Trust Plans Lessons for Schools" and, right beneath in the same column with it, a news item which reads:

"U. of W. students will construct a model of the Skagit power project for the annual Engineers' Open House" and so on.

Do you mean to stand there, Newton, and tell us without a blush that presumptuous propagandists of municipal ownership have the brazen effrontery to invade the sacred cloisters of this holy temple with their insidious doctrines, plastering Ross's estimates, Brown's promises, Erickson's invectives all over these venerable walls! Beelzebub blaspheming at the very altar were as nothing to this!

Now, there's no use beginning to whimper that this is a publicly owned enterprise and that you thought that that was different, because when we turn to page 12, here is what we find:

"How one of the country's oldest and richest corporations is aiding deserving students at the University of Washington to pursue their studies is revealed in the announcement that Melville T. Perkins of Tacoma has been awarded the

E. I. duPont de Nemours & Co. fellowship in chemistry. . . . There are many problems to be solved and it may be that we may uncover a new Edison here in the Northwest."

Now stop that snivelling, Newton, because it won't do you a bit of good. You know as well as we do that this is none other than the Powder Trust and that its researches may result in a new super-powder, which, exploding by accident, may blow the whole city of Seattle right out into the middle of Elliott Bay.

But, before we leave this, which of you boys is going to swear that there is not in King County or the high schools of Pierce a youth with latent ability enough to rise to immortal heights as the world's greatest authority on regulation and legislation concerning railroads, telegraphs, telephones, water systems, power companies and all other great utility enterprises,—a boy who needs but the chance, the incentive to develop such ability and fulfill his destiny to the pride and glory and joy of all of us?

Speak right up, gentlemen!

And which of you will take the responsibility of denying him such a chance?

We are not through with you yet, Newton. We now turn to your editorial page with its noble heading:—"TRUTH—JUSTICE—PUBLIC SERVICE." Let there be silence while we quote from an editorial entitled, "Be Just to Oil Industry."

"The oil industry, the basis of our present day civilization, represents an investment of \$8,000,000,000 devoted to the public service. . . . The whole industry must not be made the plaything of demagogues and cheap politics." We would like to reproduce the entire editorial but space forbids.

Eight billion dollars! Demagogues and cheap politics!!

Boys, there are more than SIXTY BILLION DOLLARS invested in the steam railroads of America alone—not to speak of the colossal sums tied up in telegraph, telephone, gas, water, street-car, electric light, electric power and other great privately owned organizations—all, too, devoted to the public service.

Is this a subject unworthy of consideration and study and thought? Are these momentous problems of finance, of law, of service to be withheld from the rising generation and hidden, like an obscene novel, from their sight?

Not on your life, Mr. Colver!

Not on your life, Mr. Burrows!

Not on your life, Mr. Fisher!

"TRUTH—JUSTICE—PUBLIC SERVICE," Mr. Colver. Read it again!

Turn to the right-hand column of your editorial page. There, under the heading "Democracy Begins in the School Room," writes Dr. Frank Crane:

"THERE IS BUT ONE PLACE WHERE THE WILD THEORIES OF HALF-BAKED ENTHUSIASTS CAN BE CORRECTED: IT IS THE SCHOOL ROOM. . . . For every dollar invested in our public schools, we should invest ten: for every dollar paid in salaries, we should pay ten: for every teacher now employed, we should have ten." Would it be sacrilegious for us to add: "For every scholarship now given, we should give ten"?

You may be seated, Mr. Colver.

* * *

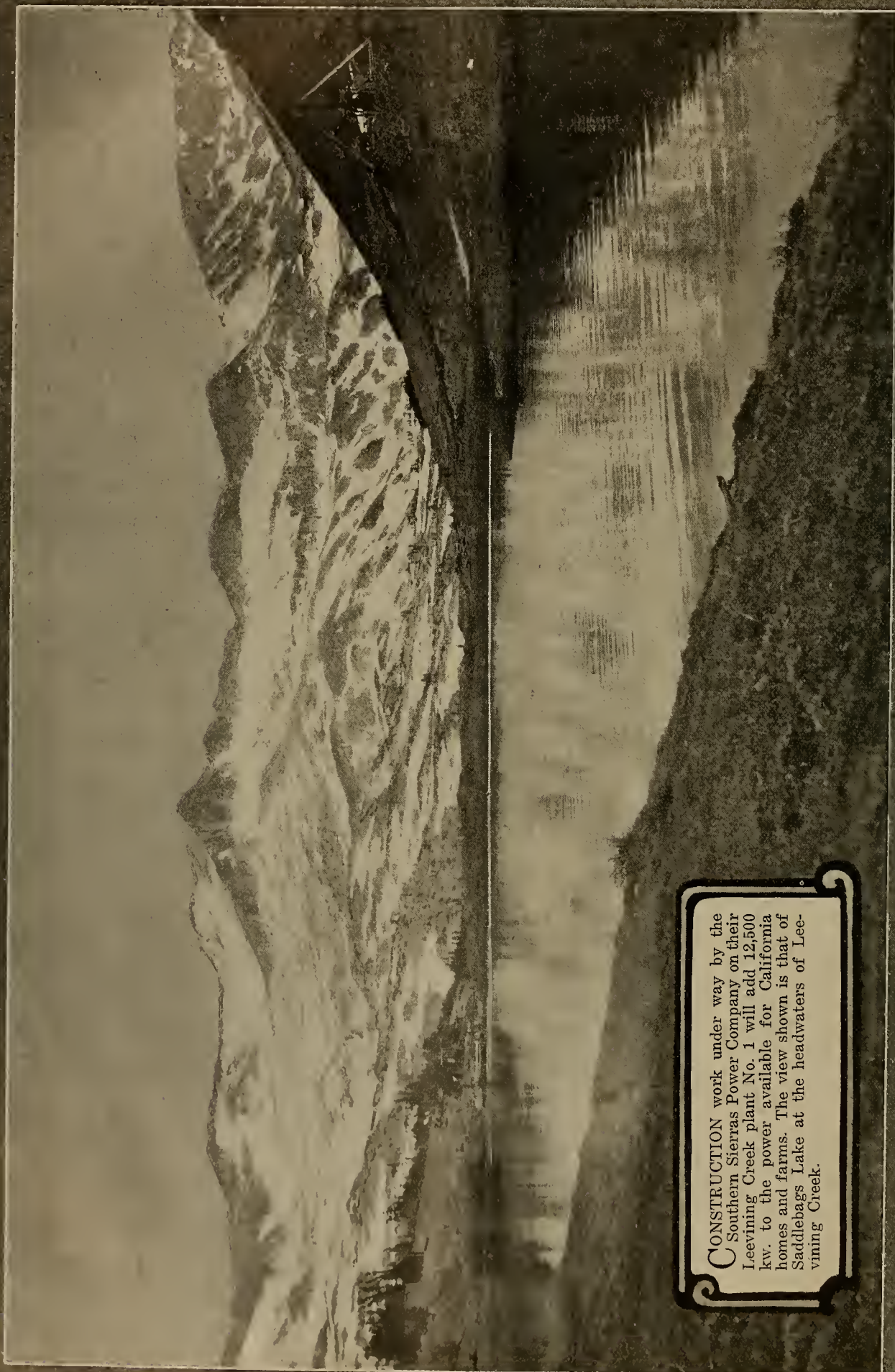
Although the theory and practice of private ownership and the theory and practice of public ownership have no place whatever in the scholarship contest, there seems to be a fear that public ownership shall not be done full justice. And yet, which member of this class would lend the stamp of official approval to a state-wide contest along similar lines that would have for its subject, "The History, Facts, Figures and Operation of Municipal Utilities as Exemplified by the City of Seattle"?—the Cedar River dam, the ferry system, the street-car lines, the Skagit hydroelectric project and all the rest of them—what they cost the taxpayers of Seattle and what they mean to the taxpayers of the state? All interspersed, of course, with liberal quotations from what Mr. Brown has to say of Mr. Lundin, what Mr. Erickson has to say of Mr. Brown, what Mr. Tindall has to say of Mr. Ross and so on down throughout the sorry mess!

Truth! Justice! What worse could be feared?

But let it all pass! The sands of time are sinking fast and our little class is drawing to a close. If, for a moment, murky intrigue hides the glory of the sun, its strong rays will soon break through and Truth and Justice and Public Service, now obscured, will light up all the heavens.

Let our minds, therefore, shed their gray ashes and glow serenely in the faith that that which is right shall triumph; and that which is wrong shall perish.

Farewell, gentlemen, and peace be with you.



CONSTRUCTION work under way by the Southern Sierras Power Company on their Leevining Creek plant No. 1 will add 12,500 kw. to the power available for California homes and farms. The view shown is that of Saddlebags Lake at the headwaters of Leevining Creek.

Can the Contractor-Dealer Be the Retail Outlet for the Industry?

By E. A. Kincaid

Associate Professor of Commerce, McIntyre School of Commerce, University of Virginia

IMPORTANT as are the problems relating to the movement of electrical products from the manufacturer to the jobber, they are almost trivial when compared with those relating to the distribution from jobber to consumer. When the great flow of electrical products reaches the jobber the stream divides and thereafter the problems of

the electrical industry must be faced from two essentially different angles. A large portion of all those goods that come into the hands of the electrical jobber is moved by him to the immediate consumers such as power companies, electric and steam railways, municipal electric light plants and great industrial corporations such as lumber manufacturers. They are the ultimate consumers of these goods and involve no problem relating to retail outlets.

Another great stream of goods flows from the jobber to retail outlets such as department stores, furniture stores, hardware stores and electrical stores, generally referred to as contractor-dealer establishments. Of these several retail outlets the only one that is purely electrical in character, the only one that confines itself to electrical goods and has all of its relations with the electrical jobber, as distinguished from other types of jobbers, is that of the contractor-dealer.

Because of the fact that the contractor-dealer specializes in electrical goods alone he is identified, part and parcel, with the entire mechanism for the marketing of electrical products. Around him there center many of the most serious problems of the electrical industry and for this reason it is now essential to make an analysis of the place of the contractor-dealer in the scheme of things electrical.

The question that first presents itself for consideration is this: What is a contractor-dealer? To begin with, one might say with perfect safety that he is an individual or firm that provides a retail outlet for electrical appliances. These fall into two main groups, both of which have the characteristic that they may be connected with the electric circuit and are, properly speaking, appliances. One group may be described as consisting of heavy appliances such as electric ranges, washers and ironers while the other includes light appliances such as electric flatirons, electric fans, various utensils used in preparation of meals, certain toilet articles, and so on. This list is not intended to be exhaustive. It should serve, however, to point out the distinction between

THE future of the contractor-dealer is one of the most serious problems confronting the electrical industry. His position in the distribution plan is a debatable question. In this article Mr. Kincaid analyzes the reasons for the present agitation regarding the contractor-dealer. In his next article he will present his solution of the problem.

the two great classes of appliances for the purpose of bringing about an understanding of problems relating to them.

In addition to appliances, the contractor-dealer provides a retail outlet for certain other lines such as fixtures and radio goods and all those materials which are ordinarily used in connection with the wiring of

residences, office buildings, hotels and so on. It is important to note that the first two groups are essentially different from the last named in that the former constitute merchandise that must be sold over the counter to customers or by house-to-house solicitation. The third group is sold by the contractor-dealer in his capacity as a contractor and installed by him under contractual arrangements with owners of homes, office buildings, hotels and the like. Wiring materials of all sorts do not involve a merchandising problem in the same sense as do other goods carried by the contractor-dealer.

It may be said, therefore, that the contractor-dealer provides a retail outlet for electrical merchandise and wiring materials. He carries two essentially different lines of goods and this results from the fact that the contractor-dealer attempts to combine two basically different types of activities. He may be described as a cross between the contractor pure and simple and the electrical merchant. This hybrid character is at once the explanation of most of his own problems as well as those of the jobbers and manufacturers who look to him to provide a way to market.

There is a wide range of opinion as to the contractor-dealer and no factor in the electrical industry has come in for so much criticism. The problem here to be faced arises from the necessity of separating the valid and sound criticism from that which is spurious and unjust.

The opinion of well informed and able men in the electrical business varies widely. Some hold that the contractor-dealer is neither contractor nor merchant but an economic incongruity, a manifestation of industrial change and a product of undirected growth and expansion of the industry. Others hold that he is the logical outlet for a great variety of electrical goods, that he should be fostered and encouraged as an indispensable factor in the marketing of electrical products, and that his shortcomings are largely the result of practices indulged in by manufacturers and jobbers on the one hand and certain

parasites, generally described as "curbstone" contractors and "pirate" dealers, on the other. The truth must be found somewhere between these two extreme positions, but not necessarily midway between them.

Defining the Contractor-Dealer

When it comes to a purely academic definition one might say that the contractor-dealer is an electrical merchant who also engages in contracting but for the fact that, just as often, he is primarily an electrical contractor who engages in merchandising on the side. When the actual conditions are faced the latter statement appears to be nearer the truth than the former, save that many will take exception to the word "merchandising" on the ground that it is something that the contractor-dealer knows nothing at all about. After all, the definition of the term contractor-dealer must be given in a purely practical way.

When viewed from the standpoint of actual conditions the contractor-dealer is found to be a person with more or less technical knowledge of the wiring of buildings. He may be a graduate pole-climber or lineman and he may have an excellent technical knowledge of standard wiring requirements, specializing in large contracts such as those having to do with the wiring of great office buildings. On the contracting side, therefore, one meets with a vast range in the calibre of men described as contractor-dealers. On the merchandising side it may be said that the contractor-dealer has but little equipment for his work. Some of them admit that they are without such equipment and that they make no effort to obtain it. Their deficiency in this respect may be ignored or it may be met in some fashion such as engaging a man with mercantile experience and training to administer the dealer part of the business.

Generally the contractor-dealer is a person of a mechanical turn of mind and as a result his interest is chiefly in the contracting side of the business. By training and experience his psychology is such that he is not readily able to think in terms of merchandising. He fails, generally, to grasp the fundamentals of a mercantile business and he does not conceive of his own business as an important link in the whole chain by which goods move from the factory to the ultimate consumer. Having none of the natural or instinctive qualities of the merchant and being recruited, as a rule, from the staff of some contracting wireman, his attitude toward the electrical industry is detached and isolated. Please note that I have used the qualifying terms, "generally" and "as a rule," for I do not propose to engage in indiscriminate condemnation of the contractor-dealer. His side of the case shall be considered in due time, and it will then appear that there are some notable exceptions which do not necessarily prove the rule.

The Volume of Trade to Be Handled

To understand the present status of the contractor-dealer it is necessary to know **how he came into being**. In the first place, it must be understood that

the development of the electrical manufacturing industry has been rapid. The following value of products turned out by the manufacturers of things electrical in recent years is substantial evidence on this point:

1909	\$221,308,563.00
1914	335,170,194.00
1919	997,968,119.00
1921	883,985,443.00

When it is understood that the decline in the value of production from 1919 to 1921 is due to the price recession that set in in June of 1920, it must be realized that the industry has been making rapid strides. The increase of production for 1919 over that for 1914 amounts to 197 per cent. These figures include all sorts of electrical products, appliances along with the others, but it is with the latter that the contractor-dealer has most to do. It is not easy to give an accurate figure as to what portion of the total output goes to the consumer by way of the contractor-dealer outlet. Some jobbers assert that not more than 40% so moves while others place the figure as high as 60%, with the amendment that the volume of goods so moving is declining.

Whatever the volume of goods finding an ultimate market through the efforts of contractor-dealers, it will be admitted that all of such goods are still subject to the characterization that they are specialties rather than staples. While electric appliances come nearer to being staples in California than in most other states, and what is true of California in this respect is also true of Pacific Coast territory in general, the fact remains that there is much yet to be done before appliances, taken as a whole, may be regarded as staples in the sense that the word is generally understood in mercantile circles.

Specializing Without a Specialist

The contractor-dealer is himself a sort of specialist within certain limits. At any rate he is a product of special conditions and it was but natural that he should respond to the suggestion that he should open a sort of specialty shop where electric goods only were for sale. Now this development would have been as effective as it was logical, if the contractor-dealer had been a specialist in merchandising rather than in contracting. Be that as it may, the idea grew apace that the contracting wireman might work along the same lines as the plumber who keeps a shop and a small line of bathroom fixtures and related goods. The contractor also had the example, still common in small towns, of hardware stores with a plumbing shop in the rear or nearby.

The contractor-dealer was in the habit of buying materials required in wiring houses and this brought him into contact with the jobber. The latter was not slow to suggest to the contractor that he might very well carry a small stock of appliances and thus make an additional profit through merchandising. When the growing volume of output of manufactured goods is taken into account, it was but natural that the jobber should feel the pressure for more outlets and that he should encourage the contractor to become a sort of dealer. The jobber was in a fair way

to do this, provided he was willing to extend credit to the contractor until he might get on his feet. Thus it came about that a variety of factors worked together to create a new type of retail outlet, a sort of infant industry, so to speak, which has not shown a marked tendency to grow out of its swaddling clothes. At any rate it appears that jobbers are still carrying many contractor-dealers.

The Responsibility of the Jobber

The part played by the jobber in bringing the new business, that of contracting and dealing in electrical goods, into being was logical and justifiable. Electrical jobbers knew of other types of retail specialty stores. They also believed that a specialist with some technical knowledge of electrical goods must handle them, if they were to be set forth to consumers in their proper light. Finally, the jobber desired to see his grip on the trade strengthened and this could be done best through retail establishments that looked to the electrical dealer and none other for goods. The case for the jobber is clear enough. He was working along right lines, but for the fact that he had poor material to draw upon. He wanted a merchandiser and he had to make use of contractors. These responded no more than partly to treatment designed to make them merchants. The jobber would probably have had much better success had he recruited from the salesmen within his own establishment, but instead he followed the line along which matters appear to be moving more or less automatically.

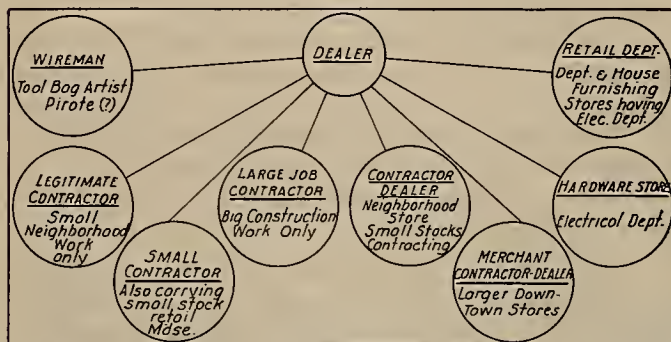
Thus there has developed a body of tradesmen known as contractor-dealers. With the growing volume of output of electrical manufactures, there was placed upon the whole marketing mechanism of the industry a heavy burden and it proved to be a bit too heavy for that part of the mechanism in charge of contractor-dealers. This fact was most obvious throughout the Pacific Coast territory at the height of the wave of prosperity that terminated in 1920 and it was again apparent in the business recovery that terminated in April, 1923. Whenever the volume of business rises, the machinery is overloaded, stresses and strains become apparent and then we hear a great deal about the contractor-dealer problem. This is just another way of referring to retail outlets for electrical goods.

Does the Contractor-Dealer Meet the Need?

Having considered in this brief and general way forces that brought the contractor-dealer into being, it is now in order to ask whether this fairly recent addition to mercantile ranks functions. It has already been intimated more or less directly that the contractor-dealer as a retail outlet does not function adequately when business is pressing. But it does not follow forthwith that the contractor-dealer system of retailing is to be held responsible for this situation. It is necessary to keep in mind the rapid growth in the volume of electrical manufactures. Considering this fact, it is but natural to suppose that these goods found their way into market by means of a marketing mechanism which was not yet

fully developed and was therefore but poorly prepared to receive the vast flow of goods. This is all the more the case when it is realized that these goods consisted of specialties which called for a highly developed system of merchandising.

Considering the movement of goods up to and including the jobber it may be said that the marketing mechanism responded fairly well. Beyond that point it was woefully inadequate. The great flow of things electrical consumerward found no thoroughly established system of retail outlets ready to absorb them. While this is not a situation for which contractor-dealers in the aggregate are responsible, it



The field of electrical retailing is recruited from various sources and it takes various forms in its functioning.

goes far toward explaining the tendency of electrical goods to move to consumers by new and strange routes. Thus, it follows that the participation of department stores, hardware stores and others in merchandising electrical goods must be looked upon as the direct consequence of the inadequacy of the outlets provided by contractor-dealers. Had these outlets been equal to the situation they would have held the business.

Not Too Late to Mend

It is my contention that the inadequacy of the contractor-dealer system of distribution is to a large extent the result of the fact that these outlets were not developed in time; that the men in charge of them were not recruited from the right source; that these outlets had not had sufficient time to find themselves and to make their place in the mechanism of distribution. When all the charges against the contractor-dealers are taken into account there is not evidence sufficient to warrant the conclusion that they cannot be made to function and that they will not find a permanent place for themselves in the marketing mechanism for electrical goods. Any such conclusion bears the earmarks of hasty analysis. Hence my answer to the question at the beginning of this section of the discussion is that the contractor-dealer does not function, but that it does not follow from this that he cannot be made to function and that he will not make a place for himself in the electrical field.

Opinions of the Trade

Let us consider somewhat more fully the present situation. I have discussed this question, "Does the contractor-dealer function?" with a variety of men, among them the most intelligent in the electrical dis-

tributing business in Pacific Coast territory. I have put this question to representatives of other branches of the electrical field and I have had many interesting and pointed responses, such as the following:

"The electrical dealer (contractor-dealer) is an economic impossibility."

"The contractor-dealer is a good outlet for supply lines used in contracting."

"Contractor-dealers provide a good retail outlet in small towns."

"The contractor-dealer does not provide a good outlet for heavy appliances."

"The contractor-dealer as a retail outlet for appliances and fixtures in cities is doomed."

"The contractor-dealer is just a contractor and often he is just a pirate who handles non-standardized goods."

"The contractor-dealer cannot hope to survive in the face of department store competition."

"The contractor-dealer could succeed if he would apply business methods."

Observations such as these might be reproduced here at great length, but enough has been said to indicate the present pessimistic attitude toward the logical retail outlet for electrical goods. Clearly it is the opinion of the best informed that at present these retail outlets do not function. But one must go behind these remarks and analyze the point of view that actuates them. This will require some consideration of the word "function." What is meant by "function"? As employed in this discussion it may be said that a contractor-dealer functions when he provides an efficient outlet for electrical goods. An efficient outlet is one that moves the goods to the consumer in such a way that they stay sold and the consumer's good will is retained while at the same time the outlet is enabled to earn a reasonable profit.

Turnover the Test for Efficiency

The two prime tests of an efficient contractor-dealer are buying-ability and selling-ability and of these two let it be said that salesmanship is not one whit less important than "buymanship." The contractor-dealer has a given amount invested in stock. The most important matter with which he is concerned is the rate of return on that investment. Suppose that he makes a net return of three per cent on each turnover of his stock and is so fortunate as to turn his stock four times each year. Is it not clear that his net is twelve per cent?

The rate of turnover is the function of two variables—buying and selling, purchases and sales. Poor buying will slow up the turnover of stock in the face of the very best salesmanship. Poor buying means buying goods in excess of actual needs and the buying of goods that do not sell. And here it may be said that manufacturers and jobbers alike are guilty of applying pressure to induce the contractor-dealer to overstock. This is not so much an indictment of the former as it is an evidence that these retail outlets do not yet command the right type of brains. However, it is true that quantity discounts are used as a means to lure many retail electrical

merchants to their ruin and incidentally to burn the fingers of those who make use of the system.

How It Is Figured

An efficient dealer in electrical goods resists all devices calculated to slow up his turnover of stock. As one authority on the subject has aptly said, "The average inventory is the denominator in the turnover fraction . . . the numerator of the turnover fraction is the annual volume of sales and success in retailing depends on moving the goods from the shelves once they are bought." All this is a, b, c to the well-informed business man, but the statement will bear repetition. To emphasize the qualities of an efficient contractor-dealer let me carry this subject one step further and show the relation of the quantity discount to rate of turnover. Suppose a situation wherein the jobber quotes the following prices on a certain product:

5 boxes	of X	.....	\$4.45	per box
10 boxes	" "	.....	4.40	" "
25 boxes	" "	.....	4.35	" "
50 boxes	" "	.....	4.20	" "

Now take the case of a retailer who can handle five boxes a month to good advantage. This order would cost him \$22.25. His resale margin (not profit for all his fixed charges must be deducted) on the five boxes would be \$2.75. Suppose, further, that his turnover is monthly or twelve times a year, his resale margin on an investment of \$22.25 would be 12x\$2.75 or \$33, equal to a resale margin of 148 per cent.

Let us consider the case of the same dealer when he undertakes to buy in fifty-box lots for the sake of the lower cost per box. He saves twenty-five cents per box and this seems very much worth while, but let us consider further. His investment is \$210 and on this investment his resale margin is \$40. But his turnover is now one in ten months and therefore his resale margin of \$40 on fifty boxes is equal to only 23 per cent. In addition to the actual loss incurred through buying in larger lots the merchant has incurred the risk of market decline, of damage to stock, a greater cost in the form of insurance and interest, and in these several ways is worse off than when he purchased according to his current requirements.

An efficient merchant is never justified in placing an order for an oversupply of any product and he should figure his purchases entirely on the basis of his turnover ability. The contractor-dealer who knows his business and observes this fundamental of merchandising may be said to be efficient with respect to buying.

The Basis for Selling Efficiency

Let us now go into the problem a bit deeper and consider the tests of efficiency with respect to selling. The contractor-dealer who hopes to succeed must have in his own person or in that of some subordinate certain qualities, to wit: (a) knowledge, (b) experience, (c) right attitude toward the work, and (d) personality. The knowledge must include knowledge of the goods with respect to their qualities and uses, and ability to bring out their selling points. Knowledge must also include knowledge of people, their

traits and ways of thinking, their ways of using goods, their methods of arriving at an appreciation of values, their standard of living and their habits and customs in consumption. Likewise knowledge must include a knowledge of the store, its plans and policies and its stock. Thus it follows that the first qualification is something definite.

Attitude toward the work is highly important. There is a definite relationship in the mind of the consumer between the goods offered and the salesman who offers them. Components of attitude are a liking for the work, a liking for people and all sorts of humankind, optimism toward life and its problems, enthusiasm and ambition. A good salesman sells himself with his goods and thus **personality** becomes important as a factor in salesmanship. Personal habits, individual peculiarities, appearance and manner all enter into personality. **Experience** is the great storehouse of accumulated knowledge upon which one may draw in order to meet new and unexpected problems. Certainly experience is not the least significant of the tests.

Perhaps this analysis of efficiency may be criticized as academic. That, however, does not condemn it. But for those who are inclined to this view let me present the matter in another light. The qualities that make a merchant may be set forth according to the essential components, but the possession of certain fundamental qualities is undeniable. The most essential thing is that the merchant shall have the point of view of the merchant, the instinctive qualities of a merchant, that he shall be one who thinks in terms of merchandise values and service, that he shall be one who sees his place as a merchant in the economic scheme of things and takes pride in the dignity of service efficiently performed.

Applying the Test

Having set forth with some pains the components of the two great fundamentals, buymanship and salesmanship, it must now be clear what is meant by efficiency as applied to retail outlet for goods, whether electrical or other goods. When the question is asked, Does the contractor-dealer function?, and it is answered that he does if he provides an efficient outlet for electrical goods, it is clear what is meant by efficient. Thus we may say that when these tests are applied, few contractor-dealers really function.

Does the ordinary critic of the contractor-dealer have these standards in mind when he condemns the contractor-dealer? Not exactly these, but standards none the less by which he measures the actual performance of the contractor-dealer. Should he have these standards in mind? Yes, as an ultimate aim. When the retailing of electrical goods is in the hands of men who grasp these primary essentials now so well known in the more highly developed fields of the mercantile world, there will be no complaint on the part of manufacturers and jobbers about the failure of the contractor-dealer to function. I will go one step further and say that until the day comes when conditions are such that men who recognize these a, b, c's of merchandising are in charge of the retail

outlets for goods, the problem of the contractor-dealer as an outlet will not be solved.

To attain the desirable situation when real merchants are in charge of contractor-dealer establishments there must be set in motion two sets of forces. First, the process of elimination that is now daily going on must be accentuated and hastened so that the unfit will be thrown out. Second, there must be some constructive educational work done for and by contractor-dealers. Here I have in mind such work as has been done by the Seattle Electric Club, the California Electrical Cooperative Campaign and one or two central stations which will be referred to hereafter.

The Touchy Question of Margins

There are those who say that it is all a question of margins. The retail margins are too narrow, profits cannot be realized and the right type of man is not attracted to the business. It seems to me that this approach to the question is just the reverse of what it ought to be. Are the margins to be so adjusted that even a lineman can merchandise with success? If so, then the costs of distribution of things electrical will rise rather than fall and the problems of the entire industry will be aggravated rather than diminished. Margins cannot be adjusted to the average type of man that engages in contracting and dealing today.

On the other hand, the right approach to this problem seems to me to be that of first ascertaining what a real merchant can do with existing margins. If a real merchant can make profits out of existing margins then these margins are right. The thing to do is not to expand the margins but to pull up the standards of the men who engage in the contracting-dealing business.

This is the right approach to the question and the only one that will effect a permanent solution of the contractor-dealer problem. When men of the right mental calibre and equipment are in charge of the retailing of electrical goods the contractor-dealer problem will melt away. There is nothing inherently wrong with the contractor-dealer outlet as a method of distribution. It is not a case of mechanism, but a case of men back of the mechanism.

The Present Situation

The discussion of the question as to whether or not the contractor-dealer functions may now be summarized. (a) It cannot be said that contractor-dealers function in the sense that they now provide efficient outlets for electrical appliances unless it be in inland and country towns. (b) That contractor-dealers do not so function is not an indictment of the system of distribution that includes them, but (c) it is rather a commentary upon those conditions that have drawn men of poor calibre and inadequate equipment into the business. (d) It therefore follows that the system of distribution should not be abandoned if educational and other constructive methods will draw into the contractor-dealer business the type of man who is competent to meet the requirements of his calling.

The Relation of Your Credit to Your Capital Investment

By Charles Goodwin*

Assistant Credit Manager, Pacific States Electric Company

IT cannot be denied that the success of a wholesale business depends very largely upon the success of those individuals or companies through which its merchandise is distributed. It therefore follows that the policies and practices which govern the conduct of the jobber's credit department, must be those which have proved to be to the best interests of the jobber's customers.

We have many times heard the self-interest story ably presented by one of our leading central station officials who brings home to us very conclusively that the dominating motive of our actions in business, and outside of business as well, is self-interest. Granting that the policy of a company is naturally the one which points toward the greatest reward or profit, would it not follow that in conforming to a credit policy which might at times seem pretty strict, the jobber is mindful of the fact that to be successful this policy must prove to be for the ultimate good of its customers?

The Responsibility of the Jobber

By a too liberal credit policy a jobber can do an injury to his trade. When an excessive line of credit is granted and accounts are extended beyond the ordinary trade terms, the jobber is encouraging the contractor-dealer to operate beyond his capital and rare is the case where such a practice leads to profit for either the contractor-dealer or jobber. The question arises, How are we to know when we are operating beyond our capital? How much business can we undertake without unduly straining our capital and introducing the dangers which attend such a practice? The credit man can judge that this condition exists in most cases where purchases are increasing and payments on the account fail to keep pace with them, and if after an investigation, he becomes convinced that the customer is undertaking more business than his capital warrants, can endeavor to discourage the practice by counseling with the customer. To take no steps to assist in remedying the situation when signs appear indicating that a contractor-dealer is operating beyond his capital, is very definitely lending encouragement to the practice.

The modern credit man recognizes as an important part of his responsibilities, the close counseling with customers in all matters relating to their financial problems and welcomes the confidence when he

THE natural impulse of the retailer to do as much business as he can is checked by the limit imposed by the wholesaler on his credit. The point where it ceases to be good business to expand your liabilities without first increasing your capital is here explained by the jobber's credit specialist.

is called upon. Naturally, however, we hardly think of calling in a doctor when all is well and healthy—and in the same way the credit man, sometimes termed a "business doctor," is not called upon nor does he usually have the opportunity to discuss the financial side of the customer's business, unless things are not going just right. It seems, therefore, that there should be a measuring-stick for the contractor-dealer to use so that he may determine for himself how much business he can undertake without extending his operations beyond his capital. In large organizations where the most modern accounting methods are employed and special departments can give study and analysis to relations and ratios, little or no difficulty arises in determining this question. It will be found that as a rule the successful corporations have enlarged their capital when necessary to permit them to share in a rapidly increasing volume of business or, where capital increases cannot be brought about, usually limit their business to the amount of capital which they can employ.

I have attempted to hit upon a simple guide or measuring-stick that could be used by the contractor-dealer who wishes to know that he is not encouraging an inflated condition in extending his business and have concluded that in most cases the answer can be arrived at by a study of the relation of liquid assets to liabilities. Liquid assets, often referred to as quick or current assets, are those which in the normal conduct of a business will find their way into the cash account and in a contractor-dealer business would generally be:

Cash, Accounts, Notes and Trade Acceptances Receivable,
Material and Labor in progress and Merchandise.

The liabilities are the total amount which a business is owing, including borrowed money, merchandise and supplies purchased.

The banker and credit man in analyzing a financial statement will usually consider the condition sound if the relation of liquid assets to liabilities is two to one or better. Manifestly, in passing judgment upon the statement, they must know that the assets reflect the true values. The two to one ratio might appear, but the standing could not be considered a healthy one, if the Accounts Receivable included long past due accounts, many of which were doubtful of collection, or if the Merchandise was largely slow-moving and obsolete or was shown in the statement at higher than current market costs.

*Paper presented before "Check" Seal organization meetings.

If the assets in a statement were on this basis, it would probably be found that a large part of the liabilities were past due.

How It Works in Practice

To illustrate these points, I have set down on charts, four financial statements. While the figures in these statements are in round numbers to simplify the illustrations, we shall assume that they are actual figures taken from the books of four contractor-dealers and that the assets show the correct values, deductions having been made for doubtful accounts and depreciation taken on merchandise.

In the first statement, it will be seen that the business has invested \$1,000 in fixed assets, such as

FINANCIAL STATEMENT (1)					
ASSETS			LIABILITIES		
Fixed Assets	\$1,000.00		Payables (Mdse.)....	\$1,500.00	
Current Assets			Owing to Bank.....	500.00	
Cash	\$ 200.00				
Receivables	2,000.00				\$2,000.00
Merchandise	3,000.00				
Work in Progress....	800.00	6,000.00	Net Worth	5,000.00	
		\$7,000.00			\$7,000.00

Furniture and Fixtures, Tools and Automobiles; that the current or liquid assets, consisting of Cash, Accounts Receivable, Merchandise and Jobs in Progress total \$6,000; and that the business is owing for merchandise purchased and borrowed money, \$2,000. The current assets are three times as great as the liabilities and a ratio exists then of three to one.

This business is in good financial condition as it could within a short period of time by collecting its Accounts Receivable, pay the liabilities in full. A going business is rarely called upon to pay its full liabilities as there are always a part, representing those incurred for current purchases, which may not be due. The point is, however, that the statement, to be considered a healthy one, should show that the business is not inflated but can liquidate its liabilities as they mature. To perceive this, we must see that the cash plus the accounts which can be collected within a reasonable period, will provide sufficient to cover the outstanding accounts payable.

FINANCIAL STATEMENT (2)					
ASSETS			LIABILITIES		
Fixed Assets	\$1,000.00		Payables (Mdse.)....	\$3,000.00	
Current Assets			Owing to Bank.....	1,500.00	
Cash	\$ 200.00				
Receivables	3,000.00				\$4,500.00
Merchandise	4,000.00				
Work in Progress....	1,800.00	9,000.00	Net Worth	5,500.00	
		\$10,000.00			\$10,000.00

Let us now look over statement No. 2. The fixed assets are in this case also \$1,000 and the current assets total \$9,000. This business shows a net worth of \$5,500, which is a larger net worth than shown in the first statement, and the owner may feel that he is proportionately better off than No. 1. In statement No. 2, however, the liabilities are \$4,500 or just one-half the amount of the current assets, bearing out a relation of two to one. In No. 1, this

relation is three to one and it must, therefore, be considered that the first business is in sounder financial condition than the second, even though the net worth in case No. 2 is the larger.

With the relation of two to one in assets to liabilities, the business in case No. 2 could, through the completion of its jobs and the collection of accounts resulting from these jobs, as well as its present accounts receivable, realize sufficient to pay the liabilities—but it will be seen that it is a slower process in this case as the jobs must be completed and collected in order to accomplish it fully.

FINANCIAL STATEMENT (3)					
ASSETS			LIABILITIES		
Fixed Assets	\$ 2000.00		Payables (Mdse.)....	\$ 8,500.00	
Current Assets			Owing to Bank.....	3,500.00	
Cash	\$ 500.00				
Receivables	6,000.00				\$12,000.00
Merchandise	9,000.00				
Work in Progress....	2,500.00	18,000.00	Net Worth	8,000.00	
		\$20,000.00			\$20,000.00

Statement No. 3 illustrates a business operating beyond its capital. This business you will note shows a net worth of \$8,000 which is substantially larger than the net worth of the other two businesses. The fixed assets are \$2,000 and the current assets, \$18,000. Looking at the liability side, we see that this business is owing suppliers \$8,500 and has a loan from the bank of \$3,500, or total accounts payable of \$12,000. With current assets of \$18,000 there is a relation of current assets to liabilities of 1½ to 1. If this business were to complete and collect for all jobs in progress and collect all outstanding accounts, it would have insufficient cash to cover its liabilities. Consequently a part of its merchandise would have to be started through the channels which would produce cash, which would then probably first be put into jobs; these, when completed, would turn into accounts receivable and would possibly thirty days later find their way into the cash account.

This business is operating to a large extent on credit instead of capital. Should the bank, due to changes in the money market or for other reasons, desire the note which they hold to be paid instead of renewed at the close of the 60 or 90-day period for which it was given, or should one or more of the larger merchandise creditors seek a reduction in their accounts, this business would have some difficulty in meeting these payments and in still retaining sufficient liquid capital to carry on its current operations.

Passing to the fourth and last statement, we see a serious condition in a business which shows a net worth of \$10,000, a larger net worth than in any of the previous examples. While an extreme case, this is not an exaggerated one, for as a matter of fact, all four statements shown in the chart are, with slight revisions, copies of financial statements taken from credit files.

In statement No. 4, the Cash, Accounts Receivable, Merchandise and Jobs in Progress total \$50,000,

which is also the total of the liabilities. The relation of current assets to liabilities is, therefore, one to one and it is due to this relation that the business is in a dangerous position. This company for its own salvation will be obliged substantially to curtail its operations and devote its energies to turning into cash the Accounts Receivable, Merchandise and Jobs

FINANCIAL STATEMENT (4)

ASSETS		LIABILITIES	
Fixed Assets	\$10,000.00	Payables (Mdse.).....	\$38,500.00
Current Assets		Owing to Bank.....	11,500.00
Cash	\$ 50.00		\$50,000.00
Receivables	24,950.00		
Merchandise	15,000.00		
Work in Progress..	10,000.00	Net Worth	10,000.00
	\$60,000.00		\$60,000.00

in Progress to meet the many large and small pressing obligations which in a case of this kind will be found to constitute the liabilities. In going through this process, the business will risk the loss of prestige and patronage as it will be unable to serve the public on the same scale as in its larger operations—nevertheless, it surely must “pull in its horns.” Close cooperation between the owner and all creditors might make it possible to save a business in this position from failure, but it would probably take a long time and would certainly require tremendous effort and application.

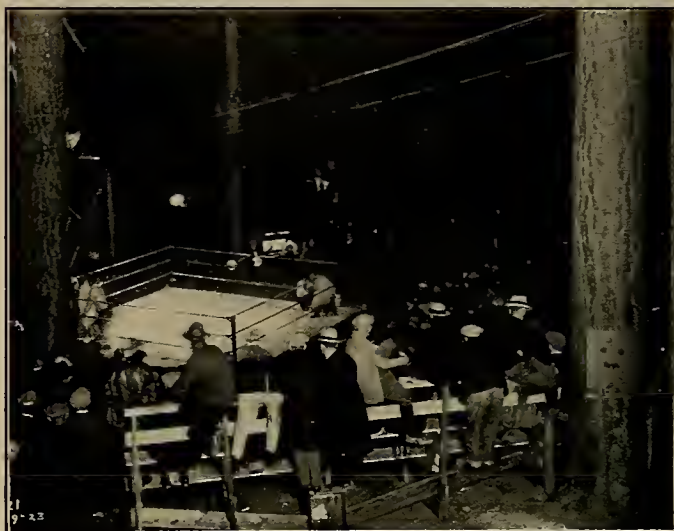
The Dangers of Inflation

In addition to the inflated financial condition which results from operating beyond the capital, it is generally true that the percentage of operating income to sales diminishes as the volume grows. This is often to be attributed to the tendency to take the larger jobs at lower rates of gross profit, and also in many instances is caused by the business being operated not alone beyond its capital, but beyond the ability of the organization. With his capital strained, the business man feels reluctant to increase his overhead by enlarging his organization. As a result, inefficiencies creep in, sometimes proving to be very expensive. Investigations cannot be made as to the credit standing on new accounts. Collections cannot be followed with the regularity which they require, job sheets cannot be priced and billed promptly, buying cannot be carefully supervised; losses result in accounts and in merchandise depreciation, all adding to the expense of doing business and placing a greater strain on the capital. If a business grows step by step and increased volume is sought concurrently with capital increases, through profit, an effective and efficient organization is built which can take care of the business—but to reach out for large business on a small capital will usually place such a strain on the capital, as well as the organization, that profits fail to accrue in proportion.

It might, therefore, be said that to gage whether a business is operating beyond its capital, a monthly comparison of the current assets and liabilities should be made. In the usual case the business can be said to be in a sound financial position if in this comparison the relation of better than two to one is borne out.

Keeping the Men Amused in Mountain Construction Camps

ONE of the things learned from army experience was the value of keeping up the morale where men were banded together. Mountain construction camps offer a problem in many respects similar to that of an army camp. A large number of men are banded together, in large part without the leaven of feminine and home interests and without the resources of any nearby community for entertainment. It has been found that the factor of labor turnover



Weekly prize fights provide entertainment and make for the growth of community spirit in the Big Creek camps of the Southern California Edison Company.

is greatly reduced if the men can be interested outside of their work, kept amused of an evening and in general taught to look to their fellows and themselves for entertainment.

Motion picture shows and radio entertainments are good in their way and have been encouraged by the power companies with mountain construction work under way. The Big Creek camps of the Southern California Edison Company, however, have solved their own problem to a large extent by instituting an intercamp series of prize fights. These are weekly events, taking place alternately at the different camps, and arouse great enthusiasm. Each group, of course, develops its local favorites and the rivalry becomes most keen. A volunteer orchestra organized among the men themselves adds variety to the entertainment.

The advantage of this type of evening program over one furnished by outside talent is obvious. The men have a part in planning and in carrying out the event and a local pride in the result, not far outclassed by the small town feeling for the home ball team. Community spirit is fostered, which manifests itself in general good feeling among the men.

These entertainments have been well attended, delegations being sent over from each camp as the event in turn takes place on the other camp's grounds—and trees and hillslopes as well as benches have to be pressed into service on occasion as bleachers.

Training the Future Employee Through Cooperative Education

By H. H. Bliss

Director of Vocational Education, Riverside Junior College,
Riverside, California

BUSINESS must have its source of supply for raw materials of labor. Such organizations as employ skilled artisans and technical men must have a source of material which is, after all, not too raw. Shall the initial bridging of the gap between the class room and the office or the power house, be left to the haphazard system of cut and discard now in force, or shall we revise our system of preparation so that there is a closer liaison between education and business, between the student and the power company or manufacturing plant that is to employ him?

Two years ago Riverside Junior College inaugurated a system of engineering education in co-operation with the major industrial and engineering establishments of Riverside and neighboring cities. The first year's operation showed the feasibility of the plan, and its scope was increased to include commercial work and to admit women as well as men students to the enjoyment of its benefits. The enrollment more than doubled in the second year, and the number of firms willing to cooperate with the college in training the future leaders of industry and business increased to include most of the larger organizations in Riverside and several other cities.

The cooperative plan has been adopted by several of the more progressive Eastern colleges, notably the University of Cincinnati, Antioch College, and the Massachusetts Institute of Technology, but no public institution in the West except Riverside Junior College has yet attempted to give its students the advantages of this type of course.

The Plan in the Junior College

In brief, the plan includes alternate monthly periods of study and employment, co-ordinated so that the work serves practically as the laboratory part of a unified course of training. Two students hold a single position, carrying on the work in alternation, so that the employer receives continuous service. At the college special courses are arranged for cooperative students, taking up the instruction, when they return, at the point where they stopped a month before. The students keep in touch with the institution while away at work, mailing in reports of home study and attending evening co-ordination meetings. Furthermore, during the period at college, they maintain contact with their jobs through occasional conferences with their alternates.

In California alone there are twenty-seven Jun-

***T**HE cooperative movement in Western education promises a supply of engineering graduates already trained in the industrial and utility fields, with their apprenticeship in practical work already behind them. Mr. Bliss tells of the successful carrying out of such an experiment in the Riverside Junior College.*

ior Colleges, offering two years of collegiate instruction. The severe overcrowding of the older colleges and universities of the state makes it imperative that an increasing proportion of the burden of higher education be borne by these junior institutions, which are in some quarters looked upon as feeders or preparatory schools for the universities. Such was not the idea of their originator, Dr. A. F. Lange, and such is not their actual function as shown in their development to date. By far the greatest part of junior college students never go to any other institution but complete their formal education within two years of leaving high school.

With this in mind it is evident that the principal work of the Junior College is, in addition to imparting culture, preparing the young men and women of the communities surrounding the institutions to participate effectively in the adult activities of those communities. The great field of the Junior College is primarily vocational, in no narrow or limited sense, but including guidance in the selection of life work and definite training toward that goal. As it is true that no one can be a good citizen who lives as a parasite on society, it is also true that to be an efficient producer and a leader in industry or business one must have a broad vision of humanity and civilization as well as of the details of one's specific vocation. Hence a truly vocational course is not only the best preparation for effective citizenship, but it also offers the foundation for real culture.

Advantages for the Student

Junior Colleges have peculiar opportunities to develop this type of course, for they are unhampered by the weight of tradition and the unwieldiness of bulk which handicap progress in older and larger schools. Located in all parts of the state, close to the homes and interests of their supporters, they can adapt their policy to the needs of the community and can secure willing cooperation from business and industry. Administrators in these fields know, even better than educators, the great and growing demand for leaders and executives with both adequate experience and broad training, and they are glad to meet the schools half way in such projects.

For the earnest and self-reliant youth, the type most in demand in progressive industries, the cooperative course offers splendid opportunities. One valuable feature is the training it gives in the

technique of production. Years of experience, co-ordinated with college instruction, give a thoroughness of understanding of processes otherwise difficult to obtain. A more important advantage lies in the opportunity to study human relationships and to become thoroughly acquainted with phases of personnel management. In modern industry and commerce a great deal depends upon "human engineering" and the varied experiences of a cooperative student give him a most valuable insight into this problem.

Many college students find it difficult or impossible to make an intelligent choice of life work without specific experience in some line of productive activity. The cooperative plan gives this experience and enables a man to learn definitely whether or not he is naturally qualified for a line of endeavor which appeals to him. He is saved the aimless casting about at the end of his college career which is so wasteful and distressing to many college graduates. Along with finding himself in a vocational way, the student develops confidence and initiative with his experience in production. Command of himself and ability to work with others for a common end are large features in his later success.

While it is to be emphasized that the great value of the cooperative course lies in the practical experience it gives and the invaluable guidance it provides in the selection of one's vocation, still an important feature is the income derived from the cooperative employment. The amount varies with the employer, the student and the type of work selected. In general, the income is nearly or quite enough to pay all college and living expenses, and a few students succeed in saving something toward paying the cost of higher education later. A young man or woman with grit enough to feel the urge toward independence, whose pride rebels against continuing to be a burden on the family income, welcomes this opportunity for self-support. The effort required to work one's way through college on any other basis is becoming more difficult year by year as the cost of living increases, and in many cases it results in an undue strain upon the student and the accumulation of debts which must be paid off while he is struggling to make a start in his chosen profession. Under the cooperative plan all students are given equal opportunity for an education, since the financial handicap is negligible.

Course of Study

Special courses in English, Economics, Science, Engineering, Stenography, Accounting, etc., are administered at the college for cooperative students, while their work in business and industry constitutes an allied laboratory course. The two branches of instruction are joined through the activities of the "co-ordinators," men who keep in touch with students on the job and with the cooperating employers, and who conduct classes in "Co-ordination" in which all phases of the work are fully discussed and analyzed. The co-ordinators are also responsible for assigning students jobs which will afford the training necessary for development; should occasion warrant, they transfer them from one department or employer to another.

Since cooperative students spend only half time at the College, it takes them usually two years to cover the same amount of academic instruction that other students obtain in a year. Some exceptionally rapid workers are able to cover the entire course in three years, but on account of the high value of the supervised practical experience, students are advised to devote four years to the cooperative course. At the end of that time some will elect to enter a higher institution, such as the State University, for two years of specialized instruction, but the majority will prefer to enter industry or business directly.

Following is the outlined curriculum for engineering students. The number of credits for each course is calculated on the basis of one unit for one lecture, recitation, or laboratory period each week for alternate months throughout the year, or two periods a week for half a year. Credit for cooperative employment, 12 units a year, is sufficient to make a total of 124 credit hours for the four years, if the student carries an average of 19 units of academic work. Most of the credits are transferable to other institutions, but some of them, such as those for co-ordination and for cooperative employment, are not accepted in institutions which do not give cooperative education. It is possible to vary from the schedule outlined below, particularly where a course, such as Materials, for instance, is given only to one section of cooperative students during one year; those in the other section may take such subjects later or earlier as may be convenient. Where parentheses appear, they indicate a choice between subjects; in general, students will not take more than one of those so marked.

COURSE OF STUDY—COOPERATIVE COURSE				
	Year: I	II	III	IV
Accounting.....	....	2	....	....
Business Organization.....	....	....	....	1
Chemistry.....	....	....	(4)	(4)
Citizenship.....	2	....	....	....
Commercial Law.....	....	....	....	1
Cooperative Employment.....	12	12	12	12
Co-ordination.....	2	2	2	2
Drawing.....	1	1	2	1
Economics.....	....	....	3	3
Electricity.....	....	....	(4)	(4)
Engineering Calculation.....	3	3	3	3
English.....	2	2	1	1
Materials of Construction.....	....	....	3	3
Physical Education.....	1	1	1	1
Physics.....	4	4	(4)	(4)
Surveying.....	4	4	....	....
	31	31	31	32

Increasing Support for Future

From the experience of a year and a half in California it appears that the cooperative plan for education in business and engineering is succeeding, as it has already succeeded in a dozen of the leading institutions of the eastern United States. The enthusiasm of the students at Riverside is very gratifying, and the loyal support and increasing cooperation of employers in several cities indicate a continued growth.

Junior Colleges and other small institutions of collegiate rank will probably discover in the cooperative plan a widening field of usefulness and a means of increasing the loyalty of their constituent communities.

Tractor Aids in Mountain Repair Work During Winter Snows

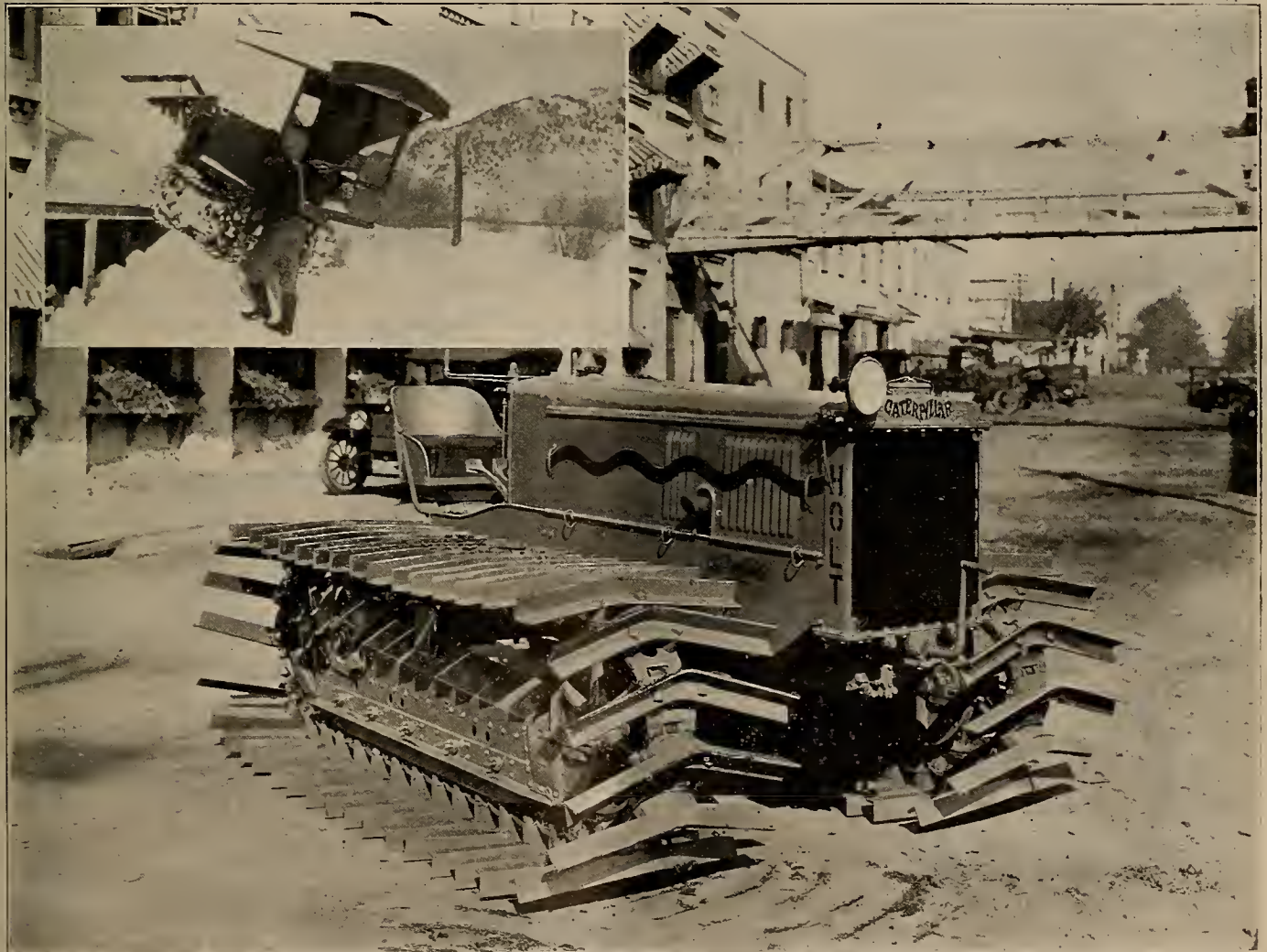
WINTER snows in mountain divisions often effectively interrupt the patrol and construction work of the power company forces. Horses cannot be used and in cases where a heavy storm has brought down a considerable section of line, it becomes very difficult to drag in the required material for the repair job.

In view of the difficulties and interruptions experienced in the Sierra districts during the winter months, the Southern Sierras Power Company has installed two small caterpillar tractors for use in hauling and patrolling over the snow. These are of the ordinary type used on the farm, with plate treads in place of the angle iron tread. These machines navigate equally well under all weather conditions and with any type of surface underneath; they climb snow banks and can be used to haul a train of wagons bearing repair material or a gang of men.

The tractor is used to replace snowshoe or ski patrols. It is when the power line goes down, however, as in the case of the high wind storm during

the past winter, that it proves invaluable. In such a case, some heavy construction is required, which ordinarily means material hauled to the spot. In past years, some of the horses in that section have been trained to the use of snowshoes, but this is uncertain and cannot be counted upon as a regular method of transportation, the major portion falling upon portage by men on snowshoes. The little tractor solves this problem neatly and ensures that the repair will be effected in reasonable time, a feat which was not always accomplished under the old methods, particularly if the necessary material did not happen to be within the immediate vicinity of the break.

The success of the method was well illustrated during the first year of its use, when its employment made possible the prompt resumption of service after a mountain storm which snapped off many of the two-pole wooden structures in the northern division. A second tractor has recently been added for use on the company's property near Mono Lake.



The small tractor, equipped with plate treads, is used by the Southern Sierras Power Company, Riverside, Calif., to haul construction material and repair gangs in its mountain divisions during the period of the deep snows. It can climb the side of a house, as well illustrated by the insert.



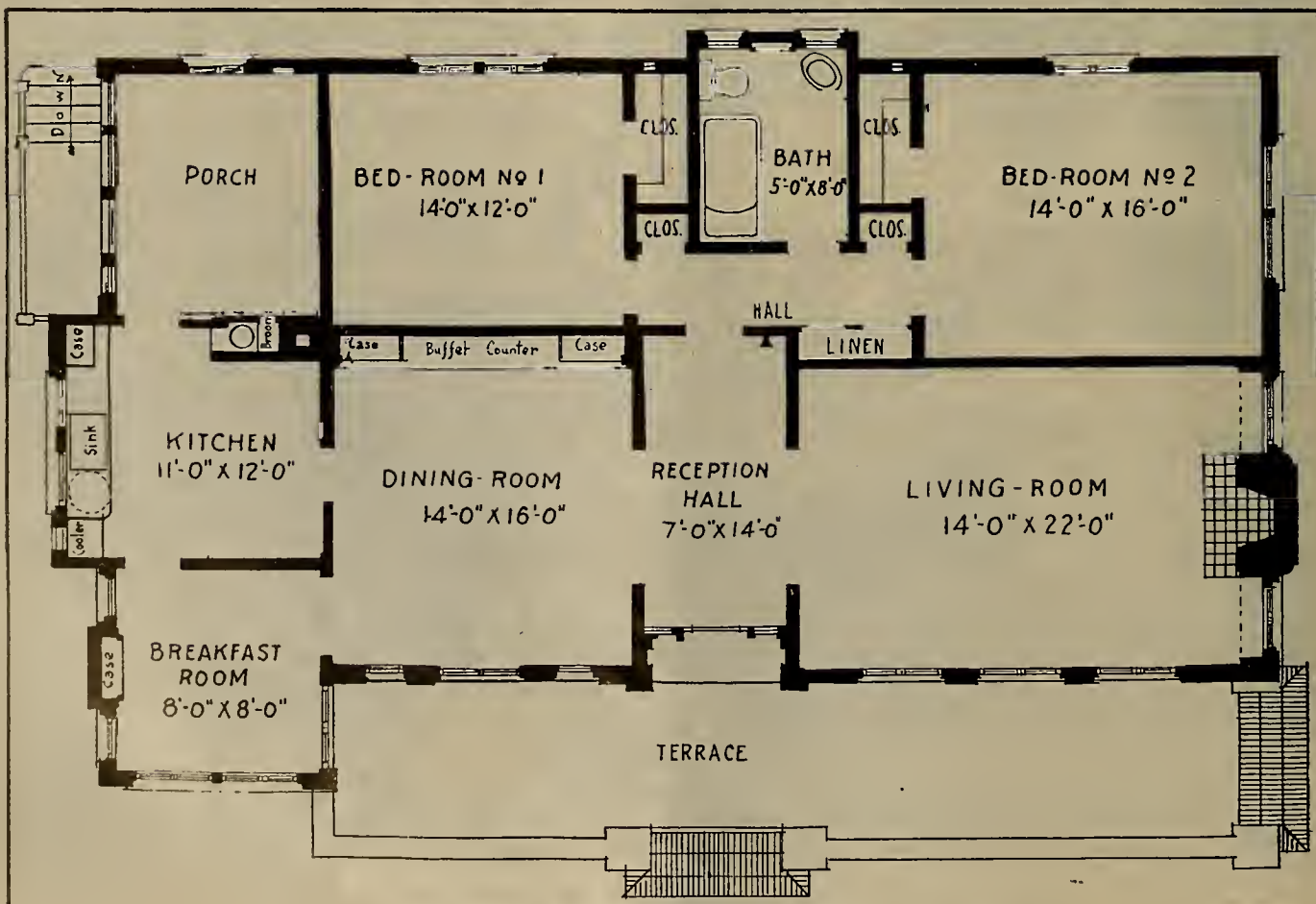
Electrical Construction

By E. Earl Browne

AIR heating requires a consideration of the structural features of the building as well as the climatic conditions, and for these reasons great care should be taken in order to calculate the proper size of heater required for a certain room. This cannot be accomplished by guess or any set rule as to a certain capacity for a certain volume as the capacity necessary can vary from $\frac{1}{2}$ watt per cu. ft. to $3\frac{1}{2}$ watts per cu. ft., according to the size of the room and the radiation losses. A heater that is too small for properly heating the room only makes a dissatisfied customer to the detriment of electric heating in general. The points to be considered in calculating the heater capacity for any room area follow:

1. Area of glass.
2. Area, construction and exposure of outside walls.
3. Area and construction of inside walls and the nature of the adjoining room.
4. Area and construction of floor; also a thorough understanding of the conditions under the floor.
5. Area and construction of ceiling; also whether with floor above or open attic.
6. Volume of air in room.
7. Number of air changes per hour.

The position of the heater should be given careful consideration. The proper position of heaters is usually found to be directly in front of the windows



Floor plan of house for which electric heating equipment is computed.

Nature of Surface	Watts					
	10°F	20°F	30°F	40°F	50°F	60°F
1—Single glass.....	3.0	6.0	9.0	12.0	15.0	18.0
2—Double glass.....	1.7	3.4	5.1	6.8	8.5	10.2
3—Single skylight.....	3.5	7.0	10.5	14.0	17.5	21.0
4—Double skylight.....	1.8	3.6	5.4	7.2	9.0	10.8
5—4-in. Brick wall.....	1.9	3.8	5.7	7.6	9.5	11.4
6—8-in. Brick wall.....	1.3	2.6	3.9	5.2	6.5	7.8
7—12-in. Brick wall.....	.9	1.8	2.7	3.6	4.5	5.4
8—24-in. Brick wall.....	.6	1.2	1.8	2.4	3.0	3.6
9—4-in. Concrete wall.....	2.3	4.6	6.9	9.2	11.5	13.8
10—8-in. Concrete Wall.....	1.6	3.2	4.8	6.4	8.0	9.6
11—12-in. Concrete wall.....	1.1	2.2	3.3	4.4	5.5	6.6
12—24-in. Concrete wall.....	.7	1.4	2.1	2.8	3.5	4.2
13—Outside wall plastered and sided.....	1.3	2.6	3.9	4.2	6.5	7.8
14—Partitions, lath and plaster both sides.....	1.0	2.0	3.0	4.0	5.0	6.0
15—1-in. Wood partition.....	1.2	2.6	3.6	4.8	6.0	7.2
16—Wood floor (double board).....	.25	.5	.75	1.0	1.25	1.5
17—Cement flooring.....	.9	1.8	2.7	3.6	4.5	5.4
18—Wood ceiling.....	.3	.6	.9	1.2	1.5	1.8
19—Plastered ceiling (floor above).....	.75	1.5	2.25	3.0	3.75	4.5
20—Plastered ceiling (no floor above).....	1.0	2.0	3.0	4.0	5.0	6.0
21—Air per 100 cu. ft.....	5.4	10.8	16.2	21.6	27.0	32.4

Table I—Showing heat lost by radiation expressed in watts per sq. ft. of surface area, computed for various differences in degrees Fahrenheit between exterior and interior temperatures.

so as to move the air from the window and not towards the cold glass which radiates the heat rapidly, as will be seen by referring to Table I.

In applying item No. 21 of this table the number of air changes per hour must be decided upon, after which it is but necessary to multiply the volume of the room in cu. ft. by the number of changes per hour. The number of air changes per hour varies from 1 to 10, depending on the occupancy of the building. For rooms that have sides exposed to winds and for buildings heated intermittently with long intervals of non-heating, 10 to 25 per cent should be added to the heater capacity.

With these facts in mind, we will now calculate the proper installation for a residence, the floor plan of which is given in Fig. 1.

Table II shows the various room sizes under consideration.

TABLE II

Living Room.....	14 x 22 x 9-ft. ceiling
Reception Hall.....	7 x 14 x 9-ft. ceiling
Dining Room.....	14 x 16 x 9-ft. ceiling
Breakfast Room.....	8 x 8 x 9-ft. ceiling
Kitchen.....	11 x 12 x 9-ft. ceiling
Bedroom.....	14 x 12 x 9-ft. ceiling
Bath Room.....	5 x 8 x 9-ft. ceiling
Bedroom.....	14 x 16 x 9-ft. ceiling

It is assumed that the temperature difference between inside and outside air is 30 deg. F. and 20 deg. F. between adjoining rooms; outside walls plastered and sided; wood floors; plastered ceilings, no floors above.

One air change per hour in all rooms has been estimated.

LIVING ROOM

Outside walls.....	(14+22)=36x 9=324—80 sq. ft. glass=244x3.9 =952
Inside walls.....	(14+22)=36x 9=324 =324x2.0 =648
Floor.....	14x22=308 =308x0.75 =231
Ceiling.....	14x22=308 =308x3.0 =924
Glass.....	80 =80x9.0 =720
Air.....	14x22x9x1x16.2 =449
100	
Total Watts	=3,924

RECEPTION HALL

Outside walls.....	7x 9=63—30 sq. ft. glass=33x3.9 =129
Inside walls.....	14+7+14=35x9 =315x2.0 =630
Floor.....	7x14=98 =98x0.75 = 74
Ceiling.....	7x14=98 =98x3.0 =294
Glass.....	30 =30x9.0 =270
Air.....	7x14x9x1x16.2 =143
100	
Total Watts	1,540

DINING ROOM

Outside walls.....	14x 9=126—45 sq. ft. glass =81x3.9 =316
Inside walls.....	14+16+14=44x9 =396x2.0 =792
Floor.....	14x16=224 =224x0.75 =168
Ceiling.....	14x16=224 =224x3.0 =672
Glass.....	45 =45x9.0 =405
Air.....	14x16x9x1x16.2 =327
100	
Total Watts	2,680

BREAKFAST ROOM

Outside walls.....	.8+8+4=20x9=180—70 sq. ft. glass=110x3.9 =429
Inside walls.....	.8+4 =12x9=108 =108x2.0 =216
Floor.....	8x8 =64 =64x0.75 = 48
Ceiling.....	8x8 =64 =64x3.0 =192
Glass.....	70 =70x9.0 =630
Air.....	8x8x9x1x16.2 =94
100	
Total Watts	1,609

KITCHEN

Outside walls.....	12+11+2=25x 9=225—30 sq. ft. glass=195x3.9 =760
Inside walls.....	12+9 =21x 9=189 =189x2.0 =378
Floor.....	11x12=132 =132x0.75 = 99
Ceiling.....	11x12=132 =132x3.0 =396
Glass.....	30 =30x9.0 =270
Air.....	11x12x9x1x16.2 =192
100	
Total Watts	2,095

BEDROOM No. 1

Outside walls.....	14x 9=126—30 sq. ft. glass= 96x3.9 =375
Inside walls.....	12+14+12=38x 9=342 =342x2.0 =684
Floor.....	12x14=168 =168x0.75 =126
Ceiling.....	12x14=168 =168x3.0 =504
Glass.....	30 =30x9.0 =270
Air.....	12x14x9x1x16.2 =245
100	
Total Watts	2,204

BATH ROOM

Outside walls.....	5x9=45—18 sq. ft. glass= 27x3.9 =105
Inside walls.....	5+8+8=21x9 =189x2.0 =378
Floor.....	5x8=40 =40x0.75 = 30
Ceiling.....	5x8=40 =40x3.0 =120
Glass.....	18 =18x9.0 =162
Air.....	5x8x9x1x16.2 =59
100	
Total Watts	854

BEDROOM No. 2

Outside walls.....	14+16=30x9=270—40 sq. ft. glass=230x3.9 =897
Inside walls.....	14+16=30x9 =270x2.0 =540
Floor.....	14x16=224 =224x0.75 =168
Ceiling.....	224 =224x3.0 =672
Glass.....	40 =40x9.0 =360
Air.....	14x16x9x1x16.2 =327
100	
Total Watts	2,964

Note that the dining room and one bedroom are of the same size (14x16) but that one requires approximately 10 per cent more wattage than the other, due to the fact that the bedroom has two outside walls. This illustrates the reason for a careful computation of all installations with all details carefully considered.

Fixture Dealer Develops New Type of Display Case

Protection from Dust and Atmosphere Are Combined with Easy Accessibility and Conspicuous Display

Electric fixture dealers have everywhere sought an adequate means of displaying their wares. On account of the nature of the goods they have always proved difficult to handle in such manner as to secure the maximum display value and at the same time to secure the protection that they require. Fixtures left in the open readily accumulate dust and their finish is frequently affected by atmospheric conditions. Particularly is this true where electricity is not used for heating and where, consequently, various fumes are prevalent in the air. Very often this has been such a serious matter that the finish has been entirely destroyed, resulting in considerable expense due to the necessity of refinishing the fixture. On the other hand, fixtures kept in drawers, as has been frequently done, or in blind wall cases, are not readily displayable and sales have been lost be-

cause the prospect did not see something that appealed to his taste.

An entirely new type of fixture display case has been originated and patented by a fixture dealer of years of experience in handling this line of merchandise. The display case is so constructed that it may be placed at any convenient location on the floor or may be raised to the level of wall cabinets. It is so arranged that twenty-four separate units may be displayed at one time and each unit is contained in a separate compartment. Cases may be built for a larger number of units where this is desirable. The front of the case is composed of two sliding doors with glass fronts. This not only permits of viewing the contents of the case but also serves to keep dust and moisture from the fixtures. The interior of the case is regularly finished in white enamel but may be finished in any de-

sired color. It may also be covered with wall paper or with fabric to harmonize with special merchandise for which unusual display is desired.

Each fixture is individually mounted on a board or panel that slides in two grooves, one at the top of the partition and one at the bottom. The arrangement of these grooves permits of changing the various partitions to nearly any desired size, this variable feature allowing for fixtures of unusual measurement. The panels are wired through the back in such fashion that by connecting the fixture pigtail to the wiring of the panel, the fixture may be connected to the lighting circuit and displayed as it will appear in actual service. To display any fixture, the panel to which it is attached is drawn out of the case. Hooks are provided at the back of each panel so that it may be hung on the rail built at the top of the case. Wires lead through this rail to conduit fittings that are incorporated into the rail and by merely hanging the fixture to be displayed over one of the condulets, contact is established and the fixture may be lighted. The wires from the rail are concealed down the back of the case and connection to the lighting service may be made permanent or a terminal plug may be used to permit of connection at more than one service point. The case may be mounted on casters in order to be easily moved from one point to another.

This case is also adaptable to ceiling fixtures merely by means of a different arrangement of the grooves and panels. Any number of cases may be installed, either in a bank or distributed throughout a store or department. The finish, of course, may be made to harmonize either with the fixtures to be displayed or with the surroundings. In this way an atmosphere may be added to fixture display that is not otherwise obtainable. Fixtures in this case are set off to good advantage in still display and the assortment can, of course, be changed as often as desired.

Motor Rewinding Jobs Sold on a Percentage Business

The field of the motor dealer is one to which not a great deal of attention has been devoted. The same principles of merchandising which prevail in the sale of washing machines and electric waffle irons are applicable here, of course, but the popular factors of attractive window displays, well arranged store interiors, shining glass and gleaming nickel are not so apparent. In consequence there are really very few men who specialize in the motor field who pay much attention to the finer points of selling. They carry motors, they understand the technical side of the game—and if anybody is in need of service, they stand ready to make an estimate of the cost and to carry out the work if desired.

F. T. Broiles, of the International Electric Company of Los Angeles, believes that there is more to the selling and the rewinding of motors than this. He believes that these articles can be merchandised just as scientifically as if they were table appliances or floor lamps. With this thought in mind, he has studied the problem of his motor rewinding business and has evolved a system of pricing the jobs which he



This showcase both displays and protects the merchandise. Each fixture is attached to a panel that may be removed and hung on the rail at top of the case, thereby establishing contact with the lighting service and permitting active display.

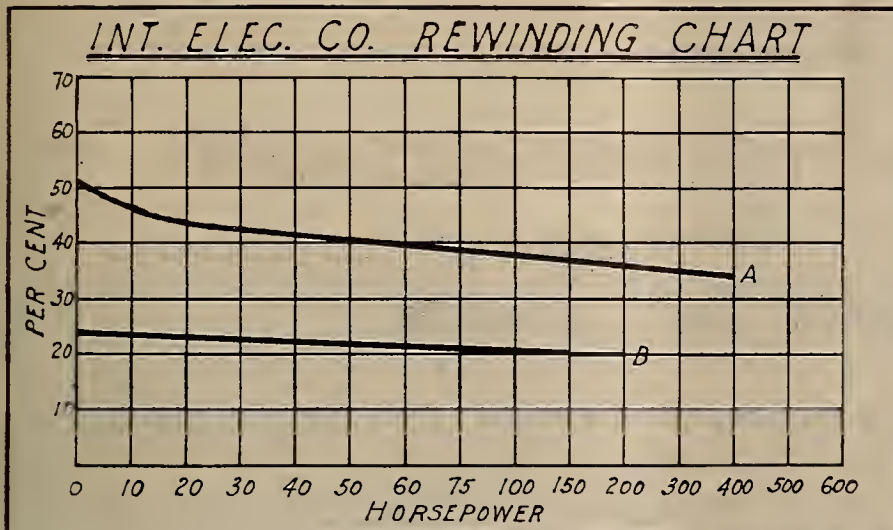


Chart used by F. T. Broiles in giving prices for motor rewinding in terms of costs of new motors. In this chart the A curve represents alternating current costs and the B curve the direct current motor winding charges.

believes offers material for a much better sales argument than the old method of fixing a price on every job submitted.

By taking costs on motor rewinding over several years' time, he has been able to figure out averages for differ-

ent sizes and types of motors and has made up a chart of motor rewinding charges which can be used to figure the price on any job in a few seconds' time. The price is expressed in percentage of the cost of the motor new. This not

only does away with the necessity for having actual dollar-and-cent figures on the chart (which might vary from time to time depending on market prices) but also gives the charge in terms which are really intelligible to the customer.

The man who is faced with the necessity of having his motor rewound must either put this piece of machinery in working condition, or buy a new one. A flat price in dollars and cents quoted to him is apt to sound high—but the same sum expressed to him in terms of the cost of the motor new, lets him see exactly how much he is saving by having the old equipment repaired. Mr. Broiles gives a guarantee with his work which makes the job equivalent in service to a new article.

The chart has been drawn up in neat form and has been blue printed so that a copy of it can be carried in his notebook by every representative of the firm. A reference to this chart impresses the customer as a workmanlike procedure and also shows to him that he is being quoted a standard price.

The actual curve of prices, of course, is a local matter determined by the conditions of the Los Angeles market and Mr. Broiles' own establishment. The principle, however, is one which could be applied universally. Any motor dealer can figure out his own scale of prices and establish a chart for himself which will meet his special requirements.

Earl Wilson, electrical dealer of Napa, Calif., was in San Francisco recently to investigate the matter of illumination equipment sales.

Monterey Dealer Makes Penny Bring Appliance Sales

One of the least of the things that come to hand in the course of a day is the ordinary copper penny. Its purchasing power is not very great and there was a time when it was not in favor in the West. However, one electrical dealer has found a use for the penny which magnifies its intrinsic value many times.

Just before Christmas E. Roy Nash, of the Monterey Electric Shop, Monterey, Calif., secured several hundred bright new pennies from the mint and attached one to the top of each letter he sent out to prospects and customers. The letter, which is reproduced herewith, drew attention to the saving in time and labor which could be purchased with the penny provided the prospect were the owner of a Royal washing machine.

This method of approach was so unusual that it commanded attention and brought results that were far in excess of expectations at the time the sales plan was instituted. The returns from this letter with its novel appeal brought the sale of twelve washers from about eight per cent of the letters sent out and proved that mail advertising can be successfully used by electrical contractor-dealers. In addition to the sale of washers the letters served to bring into the store a great number of people who were interested in other electrical devices and Mr. Nash reports that his sales between 5 and 9 p.m. on the day before Christmas amounted to over \$500, a large part of which he attributes to this letter.

TELEPHONE 93

MONTEREY ELECTRIC SHOP
INCORPORATED
ELECTRICAL ENGINEERS
FIXTURES - APPLIANCES - ACCESSORIES
MONTEREY, CALIFORNIA

You probably won't feel grateful for this penny because we know you can't do much with it. It won't buy much food; neither will it go very far on your laundry bill. It won't even buy a newspaper these days, but--

It will pay for enough electricity to do almost a weeks washing.

Maybe it never occurred to you that a penny could relieve friend wife of that dreaded, back-breaking job of washing, or that it would really save so much on your household expenses.

Yes sir--it will cost you practically nothing to run a ROYAL Washer long enough to do a weeks washing. It's putting it to you in a little different way, isn't it? But it's a happy thought, because you are going to buy her a Christmas gift very soon now--and there is nothing she would appreciate more than a ROYAL.

It will solve for her that disagreeable laundry problem for all time. It will save her time and it will save her health. It will pay for itself with part of the money it saves because it saves wear on clothes and saves laundry bills, and it fits right on your sanitary tubs.

And one of the nicest things about it is how easy we have made it for you to buy one for her. On our special Christmas offer you can buy a ROYAL for \$150.00 on terms of only \$10.00 down and small monthly payments starting February 1st, 1924.

At your first opportunity step in at our store, 457 Alvarado Street or phone 93 and we will gladly demonstrate this wonderful time and labor saver and deliver one at once or on Christmas morning if you prefer.

Yours for an ELECTRICAL Christmas,
MONTEREY ELECTRIC SHOP, Inc.

This letter, to which was attached a bright new penny, helped to sell twelve washing machines and more than a thousand dollars' worth of electrical appliances. Sales were as high as five hundred dollars in four hours.

JOBBER, DEALER AND SALES AGENT



Displaying the Merchandise to Suit the Clientele

Denver Contractor-Dealer Arranges Stock So That Wants of His Customers May Be Attended to with Least Effort

The problem as to how the electrical contractor-dealer shall display his stock in the retail establishment has been solved practically by Paul N. Edwards, manager of the Capitol Hill Electric Company of Denver, Colo. The company serves a well-to-do section of Denver and it is necessary that the appearance of the store be kept at a high point in order that the customers may be attracted to the establishment.

Mr. Edwards' principal problem has been to display a large amount of merchandise and at the same time keep the showroom stock in an orderly manner. Shelves and display racks, attached to the walls, have been of material assistance in arranging the stock.

On entering the company's store, the customer first finds a stock of purely staple devices. This stock includes a display of lamps, toasters, percolators, irons, plugs, fuses and other devices that are called for frequently. The passer-by, on seeing the display in the interior of the showroom, is reminded that he is in need of certain electrical

equipment and is drawn into the store. When he has once entered the showroom it is the duty of the salesman to take care of his immediate demands and, if possible, to interest the customer in other electrical appliances.

For displaying lamps to customers the conventional display rack, with slight modifications, is used. Lamps are suspended from sockets set in the cross-piece of an inverted U-shaped standard and individual control of the lamps is provided through the use of a series of tumbler switches placed along the legs of the standard. One-half of the lamps are controlled by switches placed on one of the standards, the balance of the switches being located on the other support. Connections for appliances, being displayed to prospects, are installed in the top of the sales counter in direct view of the person interested in the device. In this way the salesman, in demonstrating the appliance, accomplishes two things at once. In the first place, he shows how easily the appliance may be connected to an electric

circuit and at the same time places the idea in the prospect's mind that convenience outlets should be installed in his home.

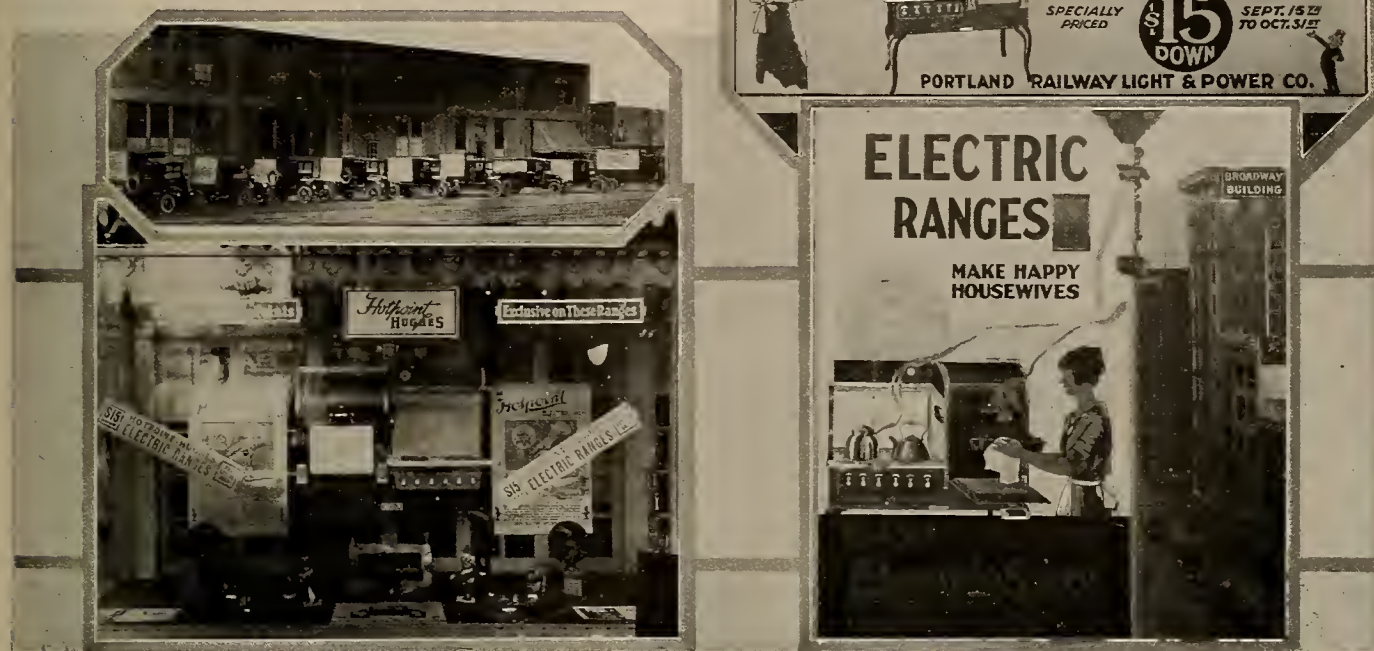
Fixtures, fixture fittings, and heavier appliances are displayed in the rear of the showroom. A showcase there presents a display of a variety of electrical devices and the ceiling and rear wall are used to present a display of ceiling and wall fixtures. One of the features of this exhibit in the rear of the showroom is a display of switch plates which is mounted on the wall. All classes, sizes and finishes of plates are attached to this board which the salesman uses to show prospects the types of plates that are suitable for the particular job. Another device that the company has made to facilitate the displaying of merchandise is a revolving rack on which are exhibited samples of wire, switches, plugs, receptacles and sockets. The customer is permitted to stand in one spot and the salesman rotates the rack, bringing the samples in front of him.

The arrangement of the store has been found to be most satisfactory, presenting as it does a large amount of material in a comparatively small space. In addition the grouping of similar devices saves time for both customer and salesman.



Two interior views of the Capitol Hill Electric Company store are shown above. Note the board for displaying switch and outlet plates in the illustration at the left, also the tumbler switches on the lamp display standards and the convenience outlet set in the counter at the right.

THE illustrations, below, show some of the means that were employed by the range department of the Portland Railway, Light & Power Company in stimulating interest in a recent sales campaign. A group of company trucks, which carried banners, is seen in the upper left and below this is a view of one of the windows used to notify city shoppers of the special offer. Six colored billboards, similar to the one shown at the upper right, were placed at strategic points and the large sign, shown in the lower right hand corner, appeared on the side of the company's building.



Specialized Departments Increase Range Sales

Portland Railway, Light & Power Company Range Department Uses Intensive Sales Effort to Increase Demand for Devices

The "Jack of All Trades" has continued to pass from the general scheme of things and in his place has come the man and company that devote specialized attention to particular items. Specialization has been brought about by the growth of large business concerns and the result has been that the public has been better served than was humanly possible under the old order, where a man was the village postmaster, leading and only merchant, justice of the peace, jovial bartender and at night the leading spirit in the movement for restriction of human liberties.

The increase of business in all directions has made it impossible for an individual to occupy all of the positions which the "village tower of strength" did and as a result each man has his own work cut out for him. He attends to one particular task and relies upon his fellow workers to do the other necessary things.

The idea of specialization has been carried down through the organizations of large concerns to the end that better service is given to the company's customers. Not many years ago one department of the central station company handled all of the business relations of the company with its customers. Then came the commercial department which conducted the contractual relations of the company and at the same time was responsible for any sales of equipment that might be made. As an outgrowth of the commercial department there developed the sales department

which conducted sales campaigns among customers and prospective customers. A still further specialization of this work has been the developing of subsidiary departments which have control of the merchandising of specific devices.

One of these, which has been found to be most useful, has been the range department of the Portland Railway, Light & Power Company. To this department, under the sales department, is given the definite work of developing the sales of electric ranges.

This department has been placed in charge of all activity in connection with the developing of range sales throughout the territory served by the company. Arrangement of cooking schools, formation of special sales campaigns and the general efforts to stimulate the demand for electric ranges are detailed to this department.

During the second half of last year this department engaged in two activities that attracted considerable attention to the advantages of cooking electrically. The first of these was a cooking school, conducted under the auspices of the Portland Oregonian and the Edison Electric Appliance Company. Seven thousand women attended the classes that were held in the power company's auditorium.

Following this the company prepared to conduct an intensive six-weeks sales campaign in Portland. The range sales department took entire charge of the campaign and for the occasion was

supplied with seven full-time outside salesmen and a specially outfitted range service wagon. The manager of the range department, directly under A. C. McMicken, sales manager of the company, was also in charge of the range display room and the store salesmen.

Extensive advertising was carried on during the campaign. Newspapers, window cards, and six colored signboard posters, 10x20 ft., were located at strategic points. Large colored banners were also attached to all of the company's trucks and a pictorial advertisement was painted upon the side of the Electric Building facing the busiest part of the city.

Results achieved by the range department were most satisfactory. Throughout the time that the campaign was in progress the sales averaged approximately ten ranges a day. The results were due no doubt, in a large measure, to the specialized activities of the range sales department.

The P. A. Geier Company of Cleveland, Ohio, has offered five cash prizes totaling \$135 for window displays featuring Royal vacuum cleaners. It is a condition of the competition that the photographs submitted must be based upon display material furnished by the Geier company in connection with its spring housecleaning sales campaign which will culminate in "Royal Week"—April 28—May 3. The judges will be J. M. Rodger, of Electrical Retailing, Clyde P. Steen, of Display World, and Frank B. Rae, Jr., advertising counselor of The P. A. Geier Company, who will award the following prizes: first, \$50; second, \$35; third, \$25; fourth, \$15; and fifth, \$10.



STORE window displays and store showrooms often provide a reliable basis for estimating the aggressiveness of the man in charge of the particular concern. Carefully arranged window displays and store interiors seldom are found in any but well managed establishments. The illustrations on this page show how four Western electrical concerns have treated windows and interiors. The pictures show: (upper right) window display of A. R. Parsons, Porterville, Calif.; (center right) interior of Boulder, Colo., store of Public Service Company of Colorado; (center left) window of Hurley Machine Company, Seattle, Wash.; (lower right) interior Field Electric Company store at San Bernardino, Calif.



Focus the Prospect's Attention—Then Sell Him

Well Planned Window Displays Arouse Interest in Particular Articles and Lead Customers to the Cash Register

To center the attention of the prospect upon the article that is to be sold is the aim of every well planned piece of advertising copy. The adjustment of type matter, white space and illustrations is all planned with the end in view that the reader's attention must eventually be focused upon only one point in the advertisement. That point is the product about which the advertisement is written.

The aim of the advertisement is to create the desire for possession and it cannot be expected to actually make the sale to the reader. Making the sale is the work of the salesman in the retail establishment into which the prospect is drawn as a result of having read the advertisement which created the desire for possession. To create this desire it is of course first necessary for the man who prepared the advertisement to focus the reader's attention upon the product. If the eye wanders aimlessly about the page and does not come to

rest at any one point the productiveness of the advertising copy is lost and the money expended will bring no returns.

If, however, by the arrangement of the advertisement, the writer is able to attract the reader's attention to the product immediately, half of the function of the copy has been completed. After the eye has been attracted to the product the arrangement is designed to lead the reader to the copy that is written around the article and if this is properly prepared the desire of ownership will be imparted to the reader and the aim of the advertisement will be achieved.

In the dressing of the window display, the skilled decorator follows much the same practice that the advertising copy writer does. The reason for this is perfectly plain as the aim of the show window and the advertisement is the same—to create the desire for ownership in the mind of the prospect. The work of the window decorator is some-

times more difficult than that of the copy writer because it is often necessary to display more than one article in the same show window. In cases such as this, each article featured in the window must be separated from the rest and the effort made to make each product a unit display.

When the decorator has only one particular device to present in any display the problem is considerably simplified. To focus the window shopper's attention upon only one article in a display window is a comparatively easy thing. To hold the attention upon this article then becomes the problem.

Holding the attention on one thing in the foreground requires that the background and other diverting objects be of subdued character and must be so arranged that if the eye wanders it will be led back to the desired location. The article being featured must be made to predominate in the display.

An example of how attention can be focused upon one point, by the judicious arrangement of everything included in the display, is shown in the accompanying illustration of a window display of the Poole Electric Company, Seattle, Wash. Herbert C. Poole, manager of the concern which is a wholesale and retail manufacturers' representative, desired to feature the Eureka vacuum cleaner in the display and decided to place the device in the center of the window and focus the attention upon it in that way.

A circular rug of dark colored plush was used as a base for the cleaner, thus setting it off from the rest of the display. The brightly polished nozzle of the cleaner resting upon this dark background made a marked contrast and as a further means of focusing the attention upon the cleaner, small white arrows were pointed at various parts of the device. In addition to the fact that these arrows attracted the prospect's eye immediately upon seeing the window, they performed the function of pulling his attention back to the central display if there was a tendency for him to let his eyes wander to other parts of the window. The arrows were also used to carry a sales message to the prospect, each arrow carrying a small amount of copy that told of the particular advantages of the cleaner.

The background of the display was also in keeping with the general scheme. Dark colored plush drapes were placed on either side of the fireplace that was built in the window and served to set this off to good advantage. As the fireplace was directly behind the central cleaner it also tended to center the attention where it was desired.

The sales message was also presented to the prospect through two placards hung on the pedestals supporting the fireplace mantel. One of these placards drew the prospect's attention to the fact that a small down payment was all that was necessary in the purchase of the cleaner and that the balance could be paid in small installments. The second placard informed the reader that a ten days' free trial period could be taken advantage of without involving any obligation upon the home owner. Two double-page advertisements from a national publication were also used in the window display. In this way the window was tied in with the national campaign and made more effective from a sales point of view.



The window display of the Poole Electric Company, Seattle, Wash., focused the prospect's attention on the center vacuum cleaner.

Showing the Home to One Out of Eight Citizens

First Electric Home Displayed in San Jose Attracts Attention of Nearly Five Thousand Residents of City

Partially because the people of San Jose, Calif., were interested in the electrification of homes and partially because a large amount of publicity was used to announce the first electric home ever displayed there, 4,910 persons visited the home and took advantage of the opportunity to see what electricity can do to make life more pleasant.

Before any preparations were made for presenting an electric home in San Jose, the California Electrical Cooperative Campaign, the sponsor of the exhibit, made a careful survey of the city in order to determine whether or not the people of San Jose were actually interested in the electrification of homes. By consulting electrical dealers in the city it was determined that the people of the community were interested and that the proper time to present the home had arrived. The contractor-dealers there felt that the sale of electrical appliances would be stimulated and that there would be increased demands for house wiring if some concrete method of displaying the advantages of the electrified home could be presented to the public.

When once it was decided that the time was right for the presenting of an electric home in San Jose, plans were immediately prepared for the erecting, furnishing and exhibiting of a model house. Negotiations were completed whereby a house being erected by the Tainter Realty Company was to be used as the electric home. A furniture company agreed to supply the draperies and interior furnishings and a music store agreed to furnish electric musical instruments. The University Electric Company was given the job of wiring the house and installing the fixtures and all of the electrical dealers of San Jose cooperated in fitting the entire house with a large list of electrical appliances.

The home was built in Westonia Park, a new residential subdivision of the city in which most of the homes are of the California bungalow type. The electric home was a five-room bungalow painted white and surmounted by a green shingle roof. Throughout the house the effort was made to make it of an un-

pretentious character, the idea being to show that a moderate priced home could be electrified as well as one that could be afforded only by persons of means.


Within the house a full complement of electrical labor-saving and comfort-producing equipment was installed. From devices designed to be operated from ordinary 110-volt convenience outlets to a four-burner electric range, the electrical equipment was as complete as could be installed in a home of that size. All the rooms were heated electrically, special 220-volt circuits with power outlets being supplied so that the heaters could be plugged-in with no inconvenience. Special care was taken with the wiring specifications for the home so that there would be an adequate number of all classes of outlets and so that proper illumination would be provided. In doing this, the standard specifications of the Cooperative Campaign were closely followed.

Advance publicity aided greatly in announcing the fact that the electric home was to be opened to the people of the city on Feb. 1. This publicity was arranged for by the Cooperative Campaign representatives in cooperation with the local electrical men. On the first Sunday that the home was open, the leading morning paper carried 226 in. of display advertising calling attention to the home. One hundred and forty-six in. of space was individual concern advertising and was paid for by the electrical men of the city and by other concerns that were responsible for the displaying of the home. In addition to this there was a half-page cooperative advertisement announcing the home and giving complete directions as to how to reach it.

Just how successful the men in charge of the home were in getting people to visit it, is shown by the attendance record which was kept by a counter stationed at the front door. This man kept a careful count of the attendance and passed to each visitor a small leaflet giving a brief description of the home. Four out of the ten days that the exhibit was opened it rained and this had a decided effect upon the attendance as

the daily count, given below, indicates. Considered from the point of view of the electrical contractor-dealers of San Jose, the electric home is reported to have been of considerable value. Many inquiries concerning the proper wiring of new homes and several requests for information relative to the installation of convenience outlets in old homes were

*Make a visit to
the Electrical
Home today
and see the
display of
electrical
appliances*

San Jose'  **ELECTRIC
COMPANY**
77 South Second Street • Phone San Jose 551

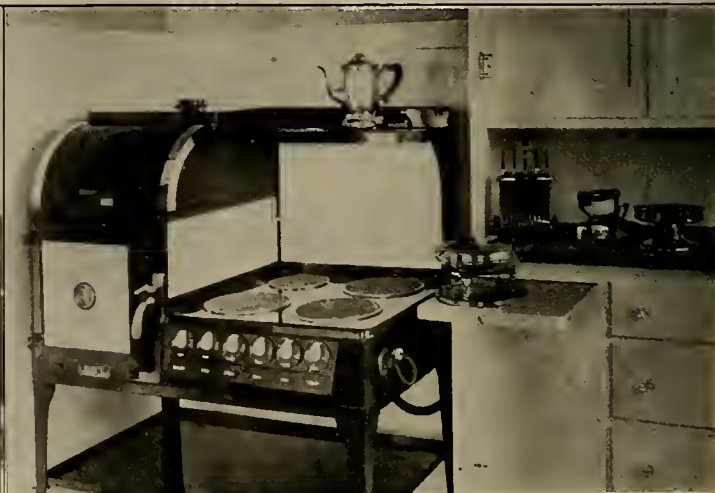
Advertisements of this character were used by dealers to attract attention to the electric home.

received during the time that the home was open. The builder of the home was present much of the time that the public were in attendance and noticing that the visitors were greatly interested in

Date	Attendance	Weather
Feb. 1—Friday	257	Raining
2—Saturday	467	Clear
3—Sunday	1,563	Clear
4—Monday	397	Clear
5—Tuesday	258	Raining
6—Wednesday	70	Raining
7—Thursday	182	Raining
8—Friday	294	Clear
9—Saturday	365	Clear
10—Sunday	1,057	Clear

Total, 4,910

an adequate supply of convenience outlets, announced that in the future he would add 100 per cent to his electrical wiring specifications in order that his houses could have more convenience and switch outlets.



The exterior of the San Jose home appealed to the eye of the passer-by and the kitchen appealed to the women on account of its electrical devices.



The three floats shown above were used by The Washington Water Power Company to illustrate how electricity has made the home of the present more livable than the one in which electricity was not used.

Telling the Electrical Story in the City Parade

The Washington Water Power Company Uses Three Floats to Show Advantages of Using Electricity in the Home

Take yourself, for example. Do you prefer to read an advertisement that is composed of a large amount of closely set type or another which is made up largely of illustrations which are only explained by short captions? Which of the two advertisements would grasp your attention and hold it longer? Which of the two, if you were to give them both merely a passing glance, would impress you the more forcefully?

In nine cases out of ten the illustrated advertisement would be the one that you would prefer to read, the one that would grasp your attention the more firmly and the one that would do more toward selling you the merchandise.

This idea of telling the story in pictures was put to work by The Washington Water Power Company last fall with excellent results. The occasion for the presentation of the electrical message in pictures was the Hallowe'en Parade which was held in Spokane, Wash. The central station company prepared its floats with the idea of showing at a glance the results of the development of water power. The leading float represented the old-fashioned kitchen with a smoking range, a woman doing the family washing, a small boy studying by the light of a kerosene lamp, and a negro beating a rug. This float was purposely made crude and rough in appearance; even the illuminated pumpkin was made to have a sad expression. In order to bring out the idea of old times, this float was drawn by a team of horses.

Following this, the next float bore a painting of the Long Lake Power House of The Washington Water Power Company. The painting was 7x14 ft. and was illuminated by spotlights and concealed footlights. The third float, which followed the picture of Long Lake, showed a cross-section of a modern kitchen, with electric range, radiant heater, washing machine, and vacuum cleaner, with a housewife in charge. This float carried a 90-volt storage battery on the front end, concealed by the dummy breakfast nook, and all lights and power for the modern kitchen and the picture of the Long Lake plant were supplied by this battery. The washing machine had a glass end with a light

inside and the radiant heater was provided with a red light lamp. Two ceiling fixtures were fitted with 50-watt lamps.

The three floats received much favorable comment and they undoubtedly constituted an effective advertisement of the electrical industry, being seen as they were, by probably 25,000 people. The commercial department of The Washington Water Power Company designed the floats and supervised their construction and operation.

FITTING A BOOT TO A BUNION

By JOE OSIER

"No man liveth and no man dieth unto himself."

So said the philosopher as he rammed an idle hand in an empty pocket, the while wondering where the next day's fodder was coming from.

Back in the days when all industry was young; when the owners of various plants and properties were their own foremen—when they wore their old clothes and did heavy lifting and—

Got acquainted with the working class—

Men hugged close to their ambitious hearts one little idea or one set of ideas, fearing to impart their knowledge lest some competitor acquire their secret, place it in practice and—

Win their marbles—but—

Today, Ol' John Business Man, personified for my purpose by any up-to-date Electrical Contractor-Dealer—

Removes a real Flor de Funeral from his smiling lips, rises to his feet in any and every meeting of his fellow-craftsmen and—

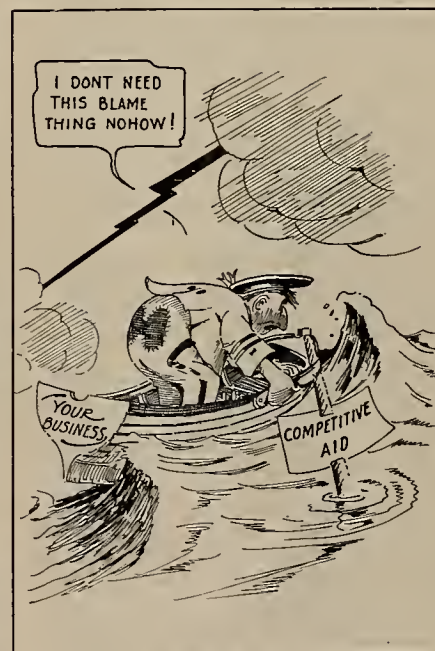
Gladly gives them the benefit of the co-ordination of his brain and head muscles. In other words, he comes as clean as a rain-drenched, wind-swept beach.

If he has developed a way to display and move a certain line of merchandise, he feels it is his duty to explain it; he cheerfully imparts his experiences in making collections, extending credit and he will take an unlimited amount of time to detail any problem which he has met and overcome but—

He expects to be paid back in like coin and, provided his brother-competi-

tors are the right sort, the cheery exchange of confidences will continue until the gong ends the final round of the session.

Here is one straight from the grease: No Business Man, no matter how many automobiles he supports, has a monopoly on ideas. He may know a certain thing better than any man in the industry but when it comes to something else, also important—



O Sailor, Beware!

His vision may be obscured—and so it goes.

And, regardless of what men in the electrical, or any other game, may say to the contrary—

Organized effort is equal to many times the separate efforts of the individuals concerned and—

An Association of men of any trade who do not foregather and feast and exchange ideas and cheer for one another—

Might just as well tear down their emblems, furl their banners, shoot their officers on the spot and—

Go it alone until their creditors and the law puts an end to the monkey business.

"If we do not hang together, we'll hang separately." And this applies to electrical men as well as rebels.

INDUSTRIAL NEWS



Conference Reports No Critical California Power Shortage

Representatives of the leading power companies in southern California announced at a meeting of spokesmen of both private and municipal electrical utilities, that at present there is no critical shortage of power. The meeting was called by the California State Railroad Commission to discuss the possibility of a power shortage in the southern part of California. The conference was held on March 10 before Commissioners Clyde L. Seavey and Harley W. Brundige.

Those in attendance at the meeting deemed it advisable to appoint a committee consisting of spokesmen for the private and municipal enterprises and headed by Lester R. Ready, chief engineer of the Railroad Commission, to investigate the situation thoroughly. The committee is to make a report before the end of March and is to advise whether radical curtailment is necessary. It was considered that the situation does not warrant the creation of a power administration to regulate the use of electricity.

This situation has been made more acute by the early demands for power for irrigation. Representatives of the Southern California Edison Company reported that rains, which recently fell in the southern part of the state, had greatly relieved this trouble both in cutting down the demand for power and increasing the available water for power development. G. C. Ward, vice-president in charge of operation and construction for the Edison company, stated that even if no more rain fell in the territory the snows now in the mountains would prevent any difficulty until after July.

All of the power companies of the southern part of the state are cooperating in the exchange of power. Energetic steps which have been taken to increase the power supply and decrease the demands will greatly assist in forestalling a serious power shortage. Among the steps that have been taken are the placing in operation of new small generating units, the placing in operation of more or less obsolete generating plants and small industrial plants and the further interconnection between generating systems.

Power Company Men to Appear at Boulder Canyon Hearings

All of the power companies interested in the development of the Colorado River have been requested by the Committee on Irrigation of the House of Representatives to send representatives to Washington to testify in the hearings now in progress on the Swing-Johnson bill, which provides for the erection by

the Federal Government of a high dam at Boulder Canyon.

While a very good case has been made before the committee by the proponents of the bill, which include Commerce Secretary Hoover and A. P. Davis, the former head of the Reclamation Service, the prospects for the passage of the measure are not bright. There is opposition to the bill on the part of those who, on grounds of economy, do not want to vote for a large appropriation. The principal opposition, however, will come from those who do not approve of this type of government construction when private capital stands ready to make the improvement.

The bill was considered exhaustively at the last session of Congress, but during the present session a new element has been brought into the proposal by the plan of the City of Los Angeles to use the Colorado River in augmenting its water supply. Various representatives of that municipality have appeared before the committee during the present hearing.

It is expected that a report, dealing with the erection of the Boulder Canyon Dam, will be presented by the fifteenth of this month. The report will be presented by a special advisory committee, appointed by the Secretary of the Interior to suggest what should be done in the proposal to build the dam at Boulder Canyon.

Bids for Cushman First Unit to Be Called March 27

The city council of Tacoma, Wash., has issued an official call for bids, to be opened March 27, for construction of the Lake Cushman power project dam and appurtenant works on the north fork of the Skokomish River in Mason County. Bids will cover the first unit of the Lake Cushman power development project, destined ultimately to furnish the city with 140,000 hp. of electrical energy. It will take 12 to 14 months for the manufacture and delivery of the power house turbines, generators, transformers and other equipment, from the date of contract, according to Ira S. Davison, commissioner of light. The estimated work involved includes:

Earth excavation, 6,755 cu. yd.; earth embankment, 7,500 cu. yd.; concrete, 84,500 cu. yd.; structural steel, 63,000 lb.; rock excavation, 13,000 cu. yd.; reinforcing steel, 280,000 lb.; reinforced concrete, 360 cu. yd.; diversion and power tunnel excavation, 14,200 cu. yd.; concrete lining, 2,300 cu. yd.; furnishing and setting valves.

The dam will be of concrete, constant-angle arch type, 275 ft. high; 80 ft. long at the base, and 800 ft. long at the crest. The appurtenant works include gates, valves, tunnels, penstock connections, screens, intake tower and chambers.

Port of Kalama, Wash., Seeks to Acquire Power Sites

Alternative applications, indicating development of a large hydroelectric plant on the Kalama River in Cowlitz County, Wash., have been received by Marvin Chase, Washington supervisor of hydraulics, from the Port of Kalama. The applications were filed for the port by J. G. Gruver. It is understood that the energy developed will be used largely for operating a pulp and paper mill.

The application for Site No. 1 asks for an appropriation of 520 sec.-ft. of water for the development of 10,386 hp. at an estimated cost of \$750,000. A conduit line 4 miles long would be constructed while the impounding dam is designed to be 50 ft. high, 50 ft. wide on the bottom and 125 ft. wide on top. The water will be used under a head of 175 ft.

The plant proposed at Site No. 2 will develop 23,863 hp., using the water under a 700-ft. head. Permission to appropriate 300 sec.-ft. of water is asked for this plant, which is estimated will cost approximately \$2,000,000. Designs call for a dam 30 ft. high, 50 ft. wide on the bottom and 100 ft. wide on top. The conduit line will be 12 miles in length. The supervisor of hydraulics has been asked to withhold action on the applications, pending completion of preliminary surveys.

A third application, which followed the first two by only a few days, has also been filed by the port officials. The latest application seeks permission to appropriate 180 sec.-ft. of water from Swift Creek in Skamania County, for the purpose of developing a hydroelectric plant with an estimated capacity of 16,363 hp. The proposed work will include the construction of a dam 30 ft. high and 100 ft. long on top, a conduit line three miles long and a power house, all of which will cost approximately \$1,300,000. It is understood that the applications are alternative and that the most feasible one will be selected.

The San Joaquin Light & Power Corporation has entered into a fifteen-year contract to purchase 6,500 kw. of electrical energy from the Turlock Irrigation District from the latter's Don Pedro hydroelectric plant in central California. The power company will begin construction immediately on a sixteen-mile 66,000-volt transmission line to bridge the gap between Turlock and Livingston, Calif., to accept delivery of the power. It is expected that the line will be completed by April 1. This interconnection will prove important in the event of a power shortage in central and southern California.

Date Set for Colorado Springs Utility Purchase Vote

With the designation of May 6 as the date for a special election to determine whether or not a bond issue will be authorized for the construction of a municipal light plant and distributing lines, the situation in Colorado Springs, Colo., has been clarified to an extent. Second only in importance to the outcome of the election is the settlement of difficulties existing at the present time between the city and the Colorado Springs Light, Heat & Power Company.

The city council has already passed an ordinance establishing the date of the special election but there is a possibility of its being changed to a later date if a report on the valuation of the present company is not completed in sufficient time. This action was taken following the recent submission to the council of another report by Franklin P. Wood, consulting engineer of Denver, covering the cost of a new distribution system coupled with estimates for building new steam and hydroelectric plants.

Mr. Wood's report covered two alternative propositions, the first for serving only Colorado Springs at an estimated cost of \$1,004,778, and the other for serving all customers now supplied with light and power by the present company at a figure of \$1,252,778. This sum includes provisions for a contingency fund. The latter arrangement concerns service to nearby communities outside of the corporate limits of the city.

The action to be taken by Colorado Springs will also affect the situation at Manitou, at the foot of Pike's Peak, where the present company is operating without a franchise. Representatives of the Manitou city council have already held several meetings with Colorado Springs officials to determine if possible the policy to be followed by the former municipality if the proposed bond issue is authorized.

Assurance that Manitou will receive light and power under favorable conditions in event Colorado Springs enters the municipal operation field was given at a joint meeting, Feb. 26. The definite arrangement for taking care of the power needs of Manitou was asked of the council in return for the right-of-way for the city's proposed transmission line across the southern border of Manitou. Nothing definite can be done pending the outcome of the election, although individual councilmen have expressed themselves as willing to treat Manitou as a favored customer.

Another phase of these negotiations is the possibility of Manitou buying its own distribution system with the purchase of power from Colorado Springs, because Manitou councilmen assert themselves more anxious to deal with the city than with the present company, which is a subsidiary of the United Gas & Electric Company.

Data from the Wood report is being used almost exclusively by Colorado Springs officials in preparing for municipal ownership. Reports from other engineers have been thrown in the discard as a result of the sentiment created in the issuance of a private report by General George W. Goethals, just prior to the election in June, 1923, when the present company was defeated in its efforts to obtain a new franchise.

An interesting note is sounded in the necessity of a steam plant as stressed by Mr. Wood, in contrast to the report of the late George G. Anderson of Los Angeles, who was definitely of the opinion that such a unit would be unnecessary. In his report Mr. Wood indicated possible delays caused by court litigation and the lapse of several years before the city could take over the full load of the present company, due to the present complicated controversy with the company.

The possibility of the city having to take over the street railway system in 1926 has deterred some municipal ownership advocates while others see in it a marked aid to the light plant problem.

Colorado Springs newspapers were adverse to the granting of a new franchise to the present company but of late have definitely announced policies opposing municipal ownership. Whether or not this will result in the formation of a citizen's committee or similar group to combat municipal ownership remains a question. There is, however, general belief both in Colorado Springs and throughout the mountain region that an opposition movement will crystallize itself which, if it functions 100 per cent, can prevent municipal ownership.

Utility and Irrigation District Sign Water Use Contract

A contract, recently signed by the Pacific Gas and Electric Company and the Nevada County Irrigation District, provides for the development of approximately 140,000 acre-ft. of water on the south and middle forks of the Yuba River, and its diversion through Lake Spaulding and power plants of the Pacific Gas and Electric Company. The water developed in Jackson Meadows and Bowman Lake and diverted by district canals to Spaulding Reservoir, after passing through the power plants and being utilized in the development of hydroelectric power by the Pacific Gas and Electric Company, will be returned to the Nevada County Irrigation District for use in irrigation in Nevada County. Negotiations for such a contract have been conducted over a period of three years.

Under the contract, as agreed upon, the Pacific Gas and Electric Company will pay to the district for water diverted through the Deer Creek power house, \$2 per acre-ft., and for water used through the Drum power house, \$3.50 per acre-ft. For power to be developed in a plant to be constructed by the company above the Spaulding Reservoir, the company will pay the district one mill per kw-hr. generated. The total revenue to be received by the district from the Pacific Gas and Electric Company will be approximately \$375,000 a year.

Among other features of the contract are the purchase by the Nevada County Irrigation District from the company of the latter's water distribution system in Nevada County. The price will be determined by the California State Railroad Commission.

The United States Senate has approved an appropriation of \$250,000 for a hydroelectric plant to be installed on the Yuma (Ariz.) irrigation project.

Formulate Plans for June Bride Window Display Contest

Plans for June Bride Week which will be held in California June 2-7 will be made entirely by the June Bride Week committee of the advisory board of the California Electrical Cooperative Campaign, according to a decision reached at the meeting of the advisory board on March 5. The special committee, headed by P. H. Booth, Edison Electric Appliance Company, Los Angeles, will lay out plans for the week and will report its activities to the advisory board.

Among the plans that have been sanctioned so far are those which call for a special window trim contest. Dealers all over the state will be given the opportunity to enter the contest and will be supplied with the necessary materials to properly decorate their windows. Prizes will be awarded to those concerns that, in the opinion of the judges, have the most satisfactory windows. Judging will be primarily on the basis of sales value, originality, and artistic treatment of the display of electric appliances in connection with the June Bride campaign.

In addition to the usual prize offer that has accompanied the window trim contests in the past, the June Bride Week committee has announced that it will pay \$1.50 to each dealer that submits photographs of his window display presented in connection with the June campaign. This award will be made only to those dealers not receiving prizes and will be made only once to each dealer, regardless of the number of pictures that he submits. This award is to be made to help reimburse dealers for the expenses of taking the pictures.

The June Bride Week committee has decided to conduct the campaign along approximately the same lines that were followed last year. The slogans will be duplicated and the window trim material will be designed along the same lines in order that the public may get to know the week as an institution. It is felt that by duplicating the effort that was made last year, the impression that was made at that time can be built up without any unnecessary duplication of energy.

Are to Conduct Lighting Sales Schools in California

Three schools for educating power company salesmen, contractors and dealers in the sale of proper lighting are to be conducted in California during the coming fall. The schools will be held under the direction of the lighting bureau of the Commercial Section of the Pacific Coast Electrical Association.

The plan is to give the men in attendance training in the fundamentals of illumination and equip them to lay out a lighting installation after a merchant has been interested through such agencies as the portable lighting exhibit of the California Electrical Cooperative Campaign. The schools will be held in San Francisco, Los Angeles and Fresno.

Pacific Coast representatives of The Hoover Company will meet in their annual sales convention in San Francisco March 17. The meeting will be held at the Clift Hotel and the various problems of the vacuum cleaner representatives will be discussed.

Electrical Facts Booklet May Be Published by Campaign

Plans for the publishing of a book of electrical facts, to be used in helping to train the staff of the California Electrical Cooperative Campaign in charge of the various electric homes, were discussed at the March 5 meeting of the advisory board of that organization. The plan was also considered to allow all electrical merchants to secure the booklet for the use of their salesmen. A committee was appointed to get out the booklet and was requested to have a dummy of the work ready for presentation at the next meeting of the advisory board, which will be held at Fresno, Calif., on April 11. The committee consists of: P. H. Booth, Edison Electric Appliance Company, chairman; W. L. Frost, Southern California Edison Company; F. H. Woodward, Great Western Power Company; W. S. Berry, Western Electric Company, and W. C. Heston, Electrical World.

During the meeting S. E. Runyon, secretary of the Furniture Dealers' Association, spoke on the Pacific Better Homes Bureau. Mr. Runyon requested the cooperation of the Cooperative Campaign in the move that is to be made to create a greater desire for home ownership on the Pacific Coast. The organization has as its purpose the education of the public; better homes; a lecture bureau; bureau of information and research; and the publication of a home and garden magazine. The method of organization will be to present the plan to various groups to get their support. No action was taken by the advisory board in regard to supporting the organization.

General reports were also received from the various committees of the advisory board, including those on June Bride Week, finance, and electric homes. Success with the electric home pre-

sented at San Jose was reported and preliminary reports from the Hollywood electric home indicated that the home there would also show satisfactory results.

The advisory board deemed it advisable to call a meeting of the heads of all electric clubs of California, during the coming spring. It was decided that the meeting should be held at Coronado at the time that the Pacific Coast Electrical Association is holding its annual convention there.

Utility Is Conducting Kitchen Lighting Campaign

A campaign for better kitchen illumination in residences on the lines of the Pacific Power & Light Company was started on Feb. 1 and will continue until March 15. This is the first campaign of the character ever attempted by the company.

Work in connection with the educational campaign is being done by sales people in the various districts and the help of the regular people will not be used. The sales plan that is being employed consists mainly of letting the results sell better illumination in the kitchen. Toward this end the company is offering its customers correct kitchen illumination for one month free of charge.

H. T. Plumb, engineer, of the Salt Lake City, Utah, office of the General Electric Company, discussed the future possibilities of radio in an address to 400 persons at the high school auditorium at Boise, Idaho, Feb. 22. Transmission of power and pictures by radio were predicted for the near future by the speaker. He told of the efforts now being made in this line, and explained theories in which experiments are being conducted.

New Rate Schedules Are Set for Idaho Power Company

The Public Utilities Commission of the State of Idaho has rejected schedule number eight of the Idaho Power Company on the ground that it is unjust and unreasonable and would work a hardship on the consumer. In place of the schedule requested by the power company the commission has set forth an adjusted schedule that shows material reductions from the rates as filed by the company. The commission states that the schedule as authorized is subject to further changes if it proves to have any unreasonable features.

With the exception of energy for irrigation—the rates for which are the same as in the 1923 schedule—the new rates are to be applied throughout the territory served by the Idaho Power Company. The leading features of the new schedule are that water heating service will now be metered—instead of being a flat rate, as heretofore—and a minimum of \$1 per month will be charged for lighting service. This minimum is to cover the first 10 kw-hr., after which the rate will be eight cents for 30 kw-hr.; five cents for the next 30 kw-hr. and four cents for the remainder.

The rate for cooking will be \$1.50 for the first 50 kw-hr.; two and one-half cents for the next 50 kw-hr. and the remainder at two cents per kw-hr. The company must install at its own expense meters for water heating service and is empowered to charge six mills per kw-hr. with a minimum of \$3.50 for a 1-kw. heater; \$2.65 for a 750-watt heater; and \$2.10 for a 600-watt heater. On new installations the rate will be one cent per kw-hr. with a minimum of \$3.50.

Federal Power Commission Rules and Regulations Changed

By action taken by the Federal Power Commission at its meeting of Jan. 25, Regulation No. 14 of the Rules and Regulations for administration of the Federal water power act was amended, effective March 1, 1924, to read as follows:

Section 1, paragraph A—

With respect to each project of more than 100 hp., there shall be a preoperation annual charge at the rate of 2 cents per horsepower of power capacity effective during the period between the issuance of the license and the first of January immediately following the date of completion of each part or unit. As each separate part or unit is completed ready for operation, the preoperation rate as to such unit shall cease on the thirty-first of December immediately following, and an operation rate will be substituted, which, for the first calendar year, will be 5 cents per horsepower of installed capacity; for the second calendar year, 10 cents per horsepower of installed capacity; for the third and each succeeding calendar year, 25 cents per horsepower of installed capacity.

Section 4, last sentence—

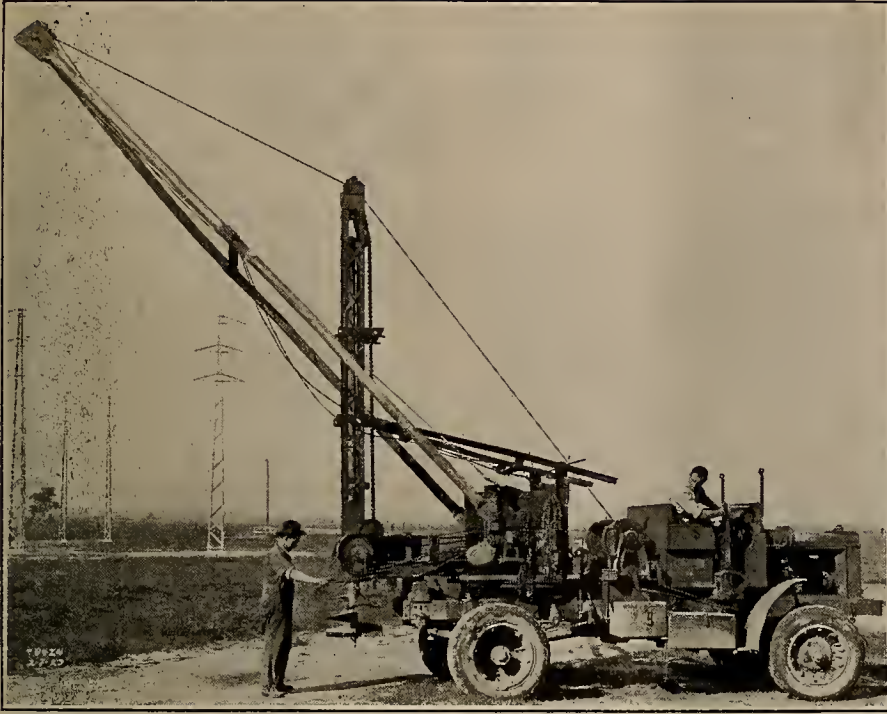
The charge shall begin on the first of January immediately succeeding completion of the project or each separate part or unit thereof.

The Commission now has in course of print the second revised issue of its Rules and Regulations embodying all amendments thereto. It is expected that copies of the new edition will be ready for distribution about April 1. Copies will be mailed upon application.

J. J. Agutter, formerly located at 1221 Fourth Avenue, Seattle, has moved to 1409 Fourth Avenue.



The map of the system of The Washington Water Power Company, reproduced above, was exhibited recently in the lobby of the Davenport Hotel, Spokane, Wash., for a period of a week. The map, which was illuminated, is 10 ft. long and 7 ft. high, and shows generating stations and local distribution centers by small electric lamps of different colors. After displaying the map at the hotel it was returned to the Electric Shop of the central station company where it had been on exhibition since last summer.



One of the earth boring machines used by the Southern California Edison Company.

Line Work Speeded Up by Use of Earth Boring Machines

Two specially designed earth boring machines, each mounted on a four-wheel-drive truck, have recently been put into service by the Southern California Edison Company. The machines are used for boring holes in the earth and for erecting poles. The new equipment has been found to be exceedingly useful in speeding the work of constructing new pole lines and in replacing poles on old lines.

The hole is bored by means of an auger similar to a wood bit. The guides in which the auger runs are adjustable as to angle and the hole can be bored either vertically or slanting. Power is derived from the drive-shaft of the truck itself. The boring mechanism can be rotated on the body of the truck to permit the boring of holes in various locations.

The machine can dig either 18 or 24-in. diameter holes to a depth of 8 ft. It carries a crew of two men who are able to do all of the work in connection with the boring of the holes and the erecting of the poles. A pole raising derrick is attached to the truck and when the truck is traveling, this derrick is lowered and the boring mechanism folded forward.

Considerable economy has been secured with the operation of the earth boring machines. According to the Southern California Edison Company, it has been found possible for one machine, manned by two employees, to dig sixty holes and set fifty poles in one working day; whereas by hand methods the average day's work consists in setting forty poles. The average cost of digging holes amounts to \$1.47 per hole which is only about 47 per cent of the cost of doing the same work by hand. The machines have also been found to be useful in excavating for tower footings and for foundations as well as for digging holes for anchors.

Industrial Heating Schools to Be Held March 17-29

Another opportunity will be given this year for power and sales engineers of central stations to attend an industrial electric heating school. This work is under the direct supervision of the industrial heating committee, power bureau, Commercial National Section, National Electric Light Association. The purpose of these schools is to teach the fundamentals of electric heating, illustrate and show how to apply the apparatus available, determine the desirable and undesirable applications, enable the engineers to determine the power requirements and consumption, and give them sufficient information to intelligently solicit and serve the industrial heating load.

Two schools are given simultaneously by the Westinghouse Electric & Manufacturing Company and the General Electric Company, beginning March 17 and covering a period of two weeks. These schools are given free, the only cost being traveling and hotel expenses. Those taking the Westinghouse course should report to Wirt S. Scott, Mansfield Works, Mansfield, Ohio. Those taking the General Electric course should report to Harold Fulwider, Schenectady Works, Schenectady, New York. For enrollment on the course, communicate with Wirt S. Scott, chairman, industrial heating division, manager industrial heating section, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

An advance copy of the report on the utilization of the Trinity River, prepared by the California Power Board, has been received by the Federal Power Commission. The report states it is desirable that the Trinity River at Sturts Fork be diverted into the Sacramento Valley. It recommends that no rights be granted which will conflict with such a plan.

Appropriation of Water Sought by California Applicants

Three permits to appropriate water in California for power purposes were issued by the Division of Water Rights of the Department of Public Works of that state during the month of February. All of the projects are of only minor importance.

Sixty-three applications for permits to appropriate water were received by the Division of Water Rights during the month, nine of which were for power projects. Four of the applications for power development sites were filed by the Fresno Irrigation District. Power development is in connection with the Fine Flat project. These applications cover the appropriation of water in Fresno County and are as follows: 120 sec.-ft. and 30,000 acre-ft. per year from the Kings River for the development of 15,000 hp.; 200 sec.-ft. and 10,000 acre-ft. per year from the South Fork of Kings River for the development of 7,000 hp.; 150 sec.-ft. and 50,000 acre-ft. per year from the Middle Fork of Kings River, with which 19,000 hp. is to be developed; and 200 sec.-ft. and 45,000 acre-ft. per year from another site on the Middle Fork of Kings River for the development of 10,000 hp.

The Feather River Power Company, San Francisco, has applied for the use of 13,290 acre-ft. of water per year from Gray Eagle, Smith and Jamison Creeks in Plumas County. The estimated development is 14,926 hp. The City of Los Angeles has applied for a permit to appropriate 50 sec.-ft. and 40,000 acre-ft. of water per year from Rock Creek in Mono County. The city proposes to develop 10,841 hp. at an estimated cost of \$400,000.

Two applications were also filed in which no estimation as to the size of the project was made. The Bear River Water & Power Company, Auburn, wishes to appropriate 250 sec.-ft. and 100,000 acre-ft. of water per year from the Bear River in Placer and Nevada Counties. The use of 30 sec.-ft. of water from the South Fork of Pit River in Modoc County is requested by John P. Booth, Likely, Calif.

Investigation of Priest Rapids Power Project Started

A field investigation of the proposed \$100,000,000 power project of the Washington Irrigation & Development Company at Priest Rapids on the Columbia River, has been undertaken by five United States Army engineers under Col. W. J. Barden, United States District Engineer, Seattle, Wash.

The development company has asked the Federal Power Commission for a license to develop the Priest Rapids power project, and the application was referred to Col. Barden, as the Columbia River is under the jurisdiction of the War Department. The only protest, to date, against the license is from the salmon packing interests of the lower Columbia River. This group alleges that the dam the company proposes to build, at a cost of \$28,000,000, will prevent salmon from reaching their spawning grounds at the Columbia headwaters.

Agents of the power company have been assembling affidavits to show that the salmon run in the upper Columbia has been decreasing.

New Rate Schedules Established for Midland Corporation

New electric rate schedules have been established for the Midland Counties Public Service Corporation by the California State Railroad Commission. The utility supplies electricity in the cities of Coalinga, Paso Robles, San Luis Obispo, Santa Maria, Arroyo Grande and surrounding and intervening towns.

The new schedules provide but one lighting rate, which is identical with the rate in effect in King City, Salinas, Monterey, Santa Cruz and Watsonville, a similar territory. This rate will cause reductions in the cost of energy for lighting varying with the conditions under which the individual consumers have been supplied.

Agricultural users as a class will receive substantial reduction, being placed upon a seasonal basis, and no longer being required to pay monthly minimums. The new rate is practically equivalent to the rate in effect upon the San Joaquin Light & Power Corporation system, including company ownership of transformers, and is lower than the agricultural rates in effect in the coast territory to the north.

Heating and cooking rates are modified by the inclusion of a minimum requirement, and an increase in the last block of energy from 1 cent to 1.3 cents. Those consumers receiving service under the combination lighting and cooking schedule will receive reductions for service of less than 160 kw-hr. per month, which is above lighting and cooking requirements for a small family. Use of energy in greater amounts will be at an advanced rate.

Service to oilfields has in the past been at the rate of 1.4 cents per kw-hr. The new rate increases this service to 1.5 cents and includes a minimum charge based upon connected load.

Forty Men Are to Attend Short Meter Course in Denver

Nearly forty central station representatives have applied for admission to the second annual short course of meter instruction at the University of Colorado during the period March 17-21, according to latest advice received from the Rocky Mountain division of the National Electric Light Association.

The first course, held during spring vacation at the university last year, was so well received that a number of added features and improvements, for the ensuing session, have been developed by the engineering faculty under the direction of Prof. C. M. McCormick. More attention will be given to evening meetings and seminars, it is understood.

Although primarily under the direction of the extension department of the University, the electrical engineering department assumes responsibility for the course which will include reading, calibration, methods of connection and testing, and similar subjects related to meters and electrical instruments. A small registration fee is charged.

F. C. Yerkes, superintendent of the electric meter department of the Public Service Company of Colorado in Denver, will be one of the instructors again this year. He has just returned from a similar duty rendered at Iowa State College where the sixth annual course for electric meter men was held with an attendance of 150. H. P. Tewksbury, head of the stores depart-

ment of the same central station and one of the original sponsors of the course, will also be on the program. In addition the Public Service Company of Colorado will provide several shop foremen to supervise the practical work featured with the course.

The city ordinance of Portland, Ore., regulating the sale of wiring material, containing about thirty words, will probably be included in the National Electrical Code at an early date, according to L. W. Going, chief electrical inspector of Portland. Mr. Going has just returned from the nineteenth Annual Convention of the Western Association of Electrical Inspectors, held at Omaha, Neb. Attempts to regulate dealers of electrical supplies in the East have failed, and it is for this reason that the request for an outline of Portland's method of regulation has been made.

Long Spans Suspended on Wooden Terminal Structures

Two spans of transmission line wire, thought to be the longest supported on wooden terminal structures, have recently been erected and the line put into service by the San Diego Consolidated Gas & Electric Company of San Diego, Calif. The first of the two spans is 4,402 ft. in length and the second is 3,397 ft. long and is immediately adjacent to the longer span.

It was originally intended to carry the line across the two canyons on one span that would be over 7,000 ft. long. This was found to be impossible because sufficient clearance could not be secured.

The line is an extension from San Diego to Alpine and was put into service as a two-wire 11,000-volt line, provision being made for a third wire which may be added at some later date. Climatic conditions, absence of storms and other factors make such long spans possible whereas they would be impracticable under other conditions.

Site Is Secured for New Steam Plant at Marshfield

The Mountain States Power Company, of Marshfield, Ore., has definitely selected a site on which the \$750,000 steam turbine power plant will be erected. About 90,000 sq. ft. of property on the Kruse and Banks holdings provides an excellent site, permitting transportation to and from the plant by rail, water and highway. These routes will enable the company to secure "hog fuel" from the nearby mills.

The first unit to be constructed will be large enough to house six times the original equipment. The initial installation will be a 6,600-hp. steam turbine to which will be connected a generator that will develop 5,000 kw. The final capacity of the plant will be 30,000 kw. The company anticipates that the plant will be working to full capacity in ten years. The boilers will be equipped to burn mill refuse primarily, but will have facilities for either oil or coal if "hog fuel" is not available at all times.

The Grays Harbor Railway & Light Company of Aberdeen, Wash., has asked for appropriation rights from the North and East Forks of the Quinault River in Grays Harbor County. Reservoir sites are also asked, but no details of proposed construction have been given, as preliminary surveys have not yet been made.

The combined forces of the Pacific Telephone & Telegraph Company of Hoquiam and Aberdeen, Wash., and the employees of the Western Electric Company engaged in enlarging the equipment of the Aberdeen and Hoquiam telephone offices, met at an informal banquet at the Hotel Washington in Aberdeen recently. H. V. Collins, manager of the Pacific Telephone's Aberdeen office, R. H. Phillips, who superintended the installation of the new equipment, and C. M. Osborn, Aberdeen wire chief, gave informal addresses.



Wood pole terminal supporting one end of 4,402-ft. span of San Diego Consolidated Gas & Electric Company's 11,000-volt line between San Diego and Alpine, California.

Washington Utility Agents Hold Annual Sales Meeting

The annual meeting of the twenty-five district and local managers of The Washington Water Power Company of Spokane, Wash., was held Feb. 13-15. J. F. Farquhar, general agent in charge of sales in the outlying towns, presided at all of the meetings.

Matters of current interest in sales of merchandise were discussed. On Feb. 14 D. L. Huntington, president of the company, gave a presentation of the general need for tax reduction, with special reference to the weakness of the so-called Erickson Super-Power Bill which has been agitated in Washington. One of the meetings was addressed by an engineer of the sales department on the subject of "Domestic Refrigerating Machines," and then the whole group visited the manufacturing plant of the Enterprise Manufacturing Company in order to inspect the refrigerating machines made by that company.

Set May 1 as Completion Date for Gorge Creek Plant

R. C. Storrie & Company, Seattle, Wash., contractors, who are erecting the Gorge Creek Plant of the Skagit hydro-electric project under development by the City of Seattle, have announced that they can complete the plant by May 1, and ask the Board of Public Works for an extension to this date. The firm has already been granted two time extensions on their contract which called for completion Sept. 22, 1923.

The terms of the contract provided that the firm was to pay \$500 a day to the city for every day after Sept. 22 that the work was unfinished, but the board has not demanded fulfillment of the penalty terms because of difficulties over which the contractors have had no control, including forest fires, floods and strikes. It has been suggested by cer-

tain city officials that the city take over the contract and undertake the completion of the Gorge Creek Plant, but this plan presents difficulties that make it inadvisable to proceed, other members of the council believe.

Serial Reports of Prime Movers Committee Published

"The Design and Maintenance of a 1,500-kw. Central Station Plant" is the title of a paper recently published by the National Electric Light Association. The booklet is known as Paper No. 24-1 and is the serial report of the prime movers committee of the 1922-23 Technical National Section of the Association. The report will not be distributed at the 1924 convention.

Papers No. 24-2, 24-3 and 24-4, all of which are serial reports of the same committee, have also been published. The titles of these booklets are, respectively: "Boiler and Turbine Room Instruments"; "Stacks and Flues" and "Operating Code Manual." Prices of the four booklets to members vary from 10 to 20 cents.

Oliver T. Erickson, who has for some years been a councilman of Seattle, Wash., and who was a candidate for re-election at the recent municipal election held in that city, was defeated by a large plurality. Mr. Erickson has been called "the Father of Municipal Ownership" and has been several times re-elected to the city council on a platform of municipal ownership.

The California Oregon Power Company is reconstructing the 66-kv. transmission line extending north from its Copco plant in California over the Siskiyou Mountains to Medford, Ore. New poles are being set and new wire strung. The reconstruction work is being carried on with no interruption to service.

Books and Bulletins

CONTINUOUS CURRENT CIRCUITS AND MACHINERY

By MORECROFT and HEHRE. 467 pages. 377 illustrations. Published by John Wiley & Sons, Inc., New York.

This text, the first of a series of two, the second to deal with alternating currents, has been prepared according to the authors, for the purpose of students in engineering schools. The material and the method of presentation is such that the ordinary college course in physics is an adequate preparation.

As a basis for the principles to follow, the electron theory is treated in the first part of the book. The authors feel that the student familiar with this theory will find his work far more interesting as many of the phenomena given as empirical facts seem reasonable from the electron viewpoint.

The fundamental principles of changing magnetic fields and the resulting induced voltages which underlie the operation of practically all electrical apparatus, have been given considerable amount of space in the text. Electric and magnetic circuits are treated in sufficient detail for the solution of all ordinary problems.

A feature of the book is the use of oscillograms as a means of amplifying a formula or illustrating some feature of operation of a machine. Oscillograms showing the flux distribution of a commutating pole generator when carrying no load and when carrying half load are an example.

Chapters have been devoted to continuous current meters, parts of a dynamo electric machine, the continuous current generator, and the continuous current motor. Efficiency, heating and rating are next treated, followed by a chapter on auxiliary apparatus used with this class of machinery. As a logical conclusion in a book of this type the two final chapters cover the various types of batteries in general use and the operation and care of continuous current machinery. As an appendix a set of fifteen experiments is given showing the procedure to be followed and the theory involved in each experiment. Fifty-nine pages of the text are given over to this important phase of engineering instruction.

For use as a text the problems at the end of most of the chapters are quite valuable. Throughout the book one is struck with the clear explanations of the various theories involved, while hand in hand with this the practical application is described in a thorough manner.

The illustrations throughout are good and up-to-date. In addition to being an excellent text for class room work, the book could well be used as a means of reference covering this important phase of electrical engineering.

E. R. S.

Reynolds Electric Company, Chicago, Ill., has announced that its New York City office, under the direction of C. W. Ellis, has been moved from 120 West 32nd Street to 129 West 31st Street.



The electrical message was presented to the people of Denver, Colo., by this booth of the Public Service Company of Colorado at the recent Industrial Exposition of the Colorado Manufacturers' Association.

Meetings

Election of Officers Is Held by Pacific Coast Jobbers

Rudolph Holterman, manager of Fobes Supply Company, San Francisco, Calif., was elected president of the Pacific Coast Electrical Supply Jobbers' Association at the quarterly meeting of that organization held at Del Monte, March 6-8. At the same meeting Albert Elliot was re-elected secretary-treasurer of the association. T. E. Bibbins, president of the Pacific States Electric Company, San Francisco, was selected to represent the Pacific Coast branch of the jobbers' association at the annual meeting of the National Electrical Supply Jobbers' Association to be held at Hot Springs, Va., June 4-6.

The aspects of the publishing business were briefly told at the open meeting of the association held on the morning of March 8. Walter V. Woehlke, managing editor of *Sunset*, told of the relationship of the general magazine to its field, emphasizing the responsibility of the editors to the readers of the magazine. C. T. Hutchinson, McGraw-Hill Company of California, addressed the jobbers on the responsibilities of the trade paper.

Oakland Electric Club Elects Officers for 1924

T. D. Rosenberg was elected president, Herbert Bell was elected vice-president, and George J. Duncan was elected secretary-treasurer of the Oakland Electric Club at the annual election recently held at the Hotel Oakland, Oakland, Calif. Walter Ayden, manager of Fobes Supply Company, Oakland; Clark Baker, of the National Lamp Works, Oakland; Fred H. Crane, Newton Hopkins and George Tudhope were elected directors.

Work of Salt Lake City Lighting Service Bureau Lauded

The first "get-together" meeting for the year 1924 of the electrical industry's various branches in Salt Lake City, Utah, was held at the Chamber of Commerce on the evening of Feb. 21. The meeting was held under the auspices of the Rocky Mountain Electrical Cooperative League, and an interesting evening was enjoyed by the seventy-five representatives of the various electrical interests present.

A motion picture illustrating correct merchandising methods was displayed as a feature of the evening's entertainment.

Stanley A. Stevens, manager of the Stevens Sales Company, and a member of the advisory board of the league, outlined the history of the present Lighting Service Bureau which is now operating in the Salt Lake City territory.

L. B. Gawan, of the Utah Power & Light Company, and one of the most active representatives of the Lighting Service Bureau, discussed the activities

of the bureau during 1923. In the course of his talk Mr. Gawan stated that 280 stores in Salt Lake City had been surveyed during the year 1923, of which 52 had made marked improvements in their lighting as a result of the recommendations of the bureau.

H. M. Ferguson, president of the Rocky Mountain Electrical Cooperative League, in a brief talk, commended the good work which is being done by the Lighting Service Bureau, and predicted that in its future activities even a greater amount of good would be accomplished.

Reports of "Smiles Armies" Are Made to San Diego Club

The "Red" army of Wm. Boyce, the tall men of the San Diego (Calif.) Electric Club, was accounted victor over the "Black" army of shorter members led by Herbert Rose, at the March 4 meeting of the club. As a result the

COMING EVENTS

Executive Committee, Commercial Section, Pacific Coast Electrical Association

San Francisco, Calif.
March 21, 1924

Engineers' Society of Pasadena—

Pasadena, Calif.
April 10, 1924

Wyoming Utility Association—

Annual Convention—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Division, National Electric Light Association—

Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Committee on Public Information—

Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

National Electric Light Association—

Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—

Absecon, N. J.
May 26-29, 1924

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 17-20, 1924

tall members were the recipients of a free meal tendered them by their shorter fellows.

Although final returns were not all in and the campaign for "courteous service" not definitely closed, the "red" army was declared winner, with nearly 650 "smile" members enrolled. The "black" army for a long time seemed the certain leaders, from preliminary reports at least, but only turned in 575 members.

With "Doc" Holloway as chairman of the better business methods committee, the idea of better business was carried out in a comprehensive and well organized speech by a well known Ad Club speaker, Tom Shore. In the same meeting it was voted that the Electric Club hold its June 17 meeting jointly with the Pacific Coast Electrical Association delegates at the Coronado Hotel.

Work is being completed on the installation of a new street lighting system for the town of Richmond, Utah.

Electric Transportation Meeting Discusses Traffic Problem

The Electric Transportation Association, San Francisco, Calif., held its regular meeting at the Fairmount Hotel, San Francisco, on March 13. K. I. Dazey, representing the CT electric truck, is president of the association and presided. The meeting was addressed briefly by H. E. Sandoval, manager of electric sales, of the Pacific Gas and Electric Company. Mr. Sandoval spoke on the success of cooperative movements and particularly of the remarkable progress of the Electric Truck Association in presenting the electric vehicle to the commercial field of the San Francisco Bay district.

V. W. Hartley, executive secretary of the California Electrical Cooperative Campaign, told of the plans of the Campaign in assisting the promotion of the electric vehicle. Capt. Henry Gleason, head of the traffic department of the San Francisco police department, spoke at length on "The Relation of Motor Vehicles to Traffic." He gave in detail some of the problems of traffic regulation and told of some of the plans that have been advanced for the relief of congestion, these plans including such measures as narrowing the sidewalks, cutting off a part of building fronts, running traffic at overhead or underground levels and the elimination of pedestrian traffic from the streets. Capt. Gleason also made it apparent that city traffic must be regulated for the orderly conduct of business and commercial pursuits rather than for the use of pleasure vehicles. An interesting comparison of the traffic problems of San Francisco and other cities of similar size also featured his remarks, and he said that if the electric vehicle would assist in solving the traffic problem it would be welcomed by the police departments of the country.

W. A. Hillebrand, high tension engineer of the Ohio Brass Company, San Francisco, was the principal speaker at the monthly meeting of the Utah chapter of the American Institute of Electrical Engineers held at Salt Lake City on the evening of Feb. 21. Mr. Hillebrand spoke on the subject of "High Tension Transmission."

The Department of Electrical Engineering of Stanford University has announced that applications for the Elwell Scholarship in electrical engineering will be received until April 1. The scholarship carries with it a stipend of \$500 and is for the purpose of aiding a young man to undertake a year of graduate study in the university's electrical engineering department. Details concerning the award of the scholarship may be received from Prof. Harris J. Ryan, executive, electrical engineering department, Stanford University, California.

A revision of the code for electric meters, approved by the American Engineering Standards Committee in 1922 as "American Standard" is now being arranged, under the sponsorship of the Association of Edison Illuminating Companies, the Bureau of Standards and the National Electric Light Association.

Manufacturer, Dealer and Jobber Activities

The Lapp Insulator Company, Le Roy, N. Y., is constructing an addition to its present plant that will double the present capacity. Among other features will be one of the largest continuous kilns in use.

The Benjamin Electric Manufacturing Company, Chicago, is now producing a socket for radio vacuum tubes called the Cle-Ra-Tone. The tube holding element of the socket floats on light springs which act as shock absorbers and neutralizes all interfering vibrations which ordinarily would cause "tube noises." The general effect is clearer reproduction. This shock absorbing feature also protects the lamp and is recommended by the manufacturer for use with portable receiving sets which are subjected to shocks in moving from place to place.

The General Electric Company has recently brought out a new automatic starter—the CR-7022—designed for use with slip-ring induction motors. It is generally similar to the CR-7056 starter for squirrel-cage motors, recently put on the market. The CR-7022 utilizes the same case, contactors, timing device and double-pole overload relay, but the accelerating contactor and starting resistor are in the secondary circuit of the motor, and three extra terminals are provided for connection to the motor secondary. As is the case with the CR-7056, this starter differs from others on the market in the employment of a magnetic drag timing device and a thermal overload relay.

Dwight P. Robinson & Company, formerly in the Hollingsworth Building, Los Angeles, Calif., have moved to new quarters at 303 Union Building, that city. C. C. Thomas is western representative for this company, the head office of which is in New York City.

The Globe Electric Supply Company, Denver, Colo., is handling Holophane reflector products in the Rocky Mountain region.

Dunham, Carrigan & Hayden, San Francisco, Calif., have been appointed jobbers for northern California for the Rutenber Electric Company, Marion, Ind. A complete stock will be carried at San Francisco. This stock will include ranges and socket devices.

The P. A. Geier Company, Cleveland, Ohio, has announced that Listenwaller & Gough, electrical jobbers of Los Angeles, are now the largest wholesale distributing agency for Royal cleaners, having passed the sales marks established and long held by a distributor in the East.

The Line Material Company, South Milwaukee, Wis., has just perfected a new type of transformer hoist, called a Davit Hoist. In general design this hoist is built similar to a boat davit. Two brackets are slipped over the cross-arms and the hoisting block is hooked into the eyebolt. The brackets are made of malleable iron and will accommodate up to a 4x5-in. crossarm. The top bracket is adjustable, sliding on the lower section of pipe to allow for varying distances between crossarms. The

lower section of the davit is made of 2½-in. diameter steel pipe; the upper section is 2-in. diameter steel pipe, fitting into and swiveling on the lower section, so the transformer can be swung to right or left. The hoist measures 6 ft. 4 in. over all, and is entirely hot galvanized. Its maximum capacity is 1,000 lb.

The Mutual Electric & Machine Company, Detroit, Mich., has just issued a new catalog on "Bull Dog" dead front type safety switchboards. This catalog may be obtained on application to the factory.

The Reiman Wholesale Electric Company, Los Angeles, Calif., is building a new warehouse on Banning Street in that city. The company will have a spur track to the building which is expected to be ready for occupancy about April 15.

The Steel City Electric Company, Pittsburgh, Pa., is staging a special sales campaign on certain of its specialties and is making special inducements to dealers who participate in the offerings.

J. C. Naylor, Northwest distributor for Eden washing machines, has moved from 184 10th Street to 53 Fourth Street, Portland, Ore., where he will continue the distribution of parts for the Eden washing machine.

The Mine & Smelter Supply Company in Denver, Colo., has reorganized its electrical supply activities with the establishment of a Westinghouse department under the direction of Thomas J. Yonley, co-ordinating with the electrical department headed by A. E. Bacon.

The Benjamin Electric Manufacturing Company, Chicago, has established representation in the Rocky Mountain region in the appointment of Thomas W. Carlson. He will cover the states of Wyoming, New Mexico, and Colorado with headquarters in Denver, Colo.

C. Brandes, Inc., New York, has announced that Harry J. Walsh, who for the past year was assistant to Director Lane of the Joint Committee for Business Development, has been appointed assistant publicity manager of the company.

The Electric Vehicle Company has been organized in Denver, Colo., by William Wrenton, formerly head of the electric vehicle department of the Public Service Company of Colorado. A selling and service franchise has been secured from the Walker Electric Truck Company of Chicago. R. J. Bardwell and Edgar McComb are also associated with the new enterprise, the headquarters of which have been established at 700 Kittredge Building.

The Western Electric Company district office in Denver, Colo., has announced the addition of Henry Tewksbury to its selling organization. Mr. Tewksbury has been a jobber's salesman for a number of years and most recently has been associated with the Hendrie & Bolthoff Manufacturing & Supply Company in Denver.

The Engineering & Supply Company, 405 San Fernando Building, Los Angeles, Calif., has been appointed agent for K-P-F switches in southern California. J. G. Monahan is manager of the Engineering & Supply Company.

The Western Electric Company is offering two new lines of motors. These are a line of single phase motors, type SCR, adaptable to a wide range of industrial applications, and a line of continuous duty riveted frame polyphase motors, re-designed types KT and KQ. SCR motors start as repulsion type and operate on the squirrel cage induction principle which entirely eliminates the short circuiting switches heretofore considered essential. The KT polyphase motors form a new and complete line. They are 40 deg., continuous duty riveted frame.



Proving conclusively that A. W. Leonard, president of the Puget Sound Power & Light Company, of Seattle, Wash., thinks of other things than power projects running into the millions and other problems of equal magnitude and importance, we herewith reproduce a view showing him seated in the act of selecting his box seat at the Seattle Baseball Park which he will occupy on several sunny afternoons, come summer. In making this selection, President Leonard became fan No. 1 for Seattle's 1924 season. The gentleman at Mr. Leonard's left is Virgil Garvey, secretary of the Seattle club, who tried to dissuade Mr. Leonard from buying the box.

Personals

R. J. Holterman, manager of Fobes Supply Company, San Francisco, Calif., was elected chairman of the Pacific Coast Electrical Supply Jobbers' Association at the recent meeting held at the Hotel Del Monte, Del Monte, Calif. Mr. Holterman has been connected with



R. J. HOLTERMAN

the electrical business for over eighteen years and has, since 1921, held his present position. He started with the California Electrical Works, which later became the Western Electric Company, in San Francisco. Later he joined the force of the Holabird Electric Company, which concern was purchased about three years ago by the Fobes Supply Company. Mr. Holterman has been an active worker in the electrical field and has been identified with many of the progressive moves for the betterment of conditions.

A. S. Moody, Los Angeles district manager of the General Electric Company, was a recent visitor to San Francisco and Del Monte, attending the quarterly meeting of the Pacific Coast Electrical Supply Jobbers' Association at that place.

U. G. Jackson, city engineer of Kelso, Wash., for three and a half years, has resigned to enter private practice.

H. C. Miller, petroleum engineer of the United States Bureau of Mines, headquartered at San Francisco, Calif., spent several days in the oil fields of California gathering data for papers on safety work being prepared by the bureau.

S. E. Gates, manager at Spokane, Wash., for the General Electric Company, has returned from an extensive trip through the East, during which he noted a tremendous interest among business men in the current developments of the Pacific Coast and the Northwest.

W. R. Lyle, representative of the General Electric Company, was a recent San Diego visitor.

William Greenfield, of the Allied Industries, San Francisco, Calif., was a guest at the March 4 meeting of the San Diego Electric Club.

James G. Loomer, of the radio department of the Western Electric Company, Los Angeles, Calif., was recently presented with a gold mounted fountain pen by the Los Angeles Electric Club. The presentation was for conspicuous work done in the club's behalf during the past year.

R. O. Brenner has been transferred to the Spokane, Wash., office of Pacific States Electric Company as salesman. Mr. Brenner has been in the Portland, Ore., office for twelve years.

H. D. Randall, of the General Electric Company, Denver, Colo., and E. A. West, of the Denver Tramway Company, Denver, have been elected to the board of directors of the electrical bureau of the Denver Civic and Commercial Association. Through an error, announcement was made in the Feb. 15 issue of the Journal of Electricity that the above had been elected to the board of directors of the Denver Electrical Cooperative League.

R. R. Jones and J. H. Gibson, of the Arizona Electric Company, Winslow, Ariz., were recent Los Angeles, Calif., visitors.

N. A. C. Smith, chief chemist of the petroleum division of the Bureau of Mines, spent two weeks at the San Francisco office of the bureau during February. Mr. Smith left San Francisco on Feb. 21 accompanied by M. J. Gavin, refinery engineer of the bureau at San Francisco, to hold a conference in Salt Lake City, Utah, and Boulder, Colo., regarding bureau activities.

LeRoy H. Crandall, for the past three years assistant to the manager of the Isko-Pacific Company, San Francisco, Calif., has joined the staff of the California Electrical Cooperative Campaign. He will cover all of the territory from San Luis Obispo to Redding with the exception of the San Francisco Bay district.

W. H. Talbott was the San Diego, Calif., representative at the Pacific Coast Electrical Association technical committee meeting at Fresno early in March.

John E. Edgerton, president of the National Association of Manufacturers, gave a very interesting address at a dinner in Seattle, Wash., on March 14, at which were present several hundred of the leading business men of that section. Mr. Edgerton spoke on the human side of industrial relations and on the present political situation.

Philip F. Apfel, president of the Electric Heating & Manufacturing Company of Seattle, Wash., was a recent business visitor to Los Angeles. Mr. Apfel, while in the city, attended the meeting of the Electric Club and stated that business on the Pacific Coast in air and water heaters is excellent.

Erroll H. Beyersdorfer, for some time southern representative of the Walker & Pratt Manufacturing Company, Boston, Mass., has been appointed representative in the Northwest for that company. He will make his headquarters at Portland, Ore., and will cover the states of Washington, Oregon, Idaho, Montana and Utah.

Sam Mesick, for several years with Woodill-Hulse Electric Company, Los Angeles, Calif., has been made manager of the Bryan-Marsh lamp department of the Reiman Wholesale Electric Company, Los Angeles.

Roy E. Wenk, for several years connected with the engineering department of the Puget Sound Power & Light Company, Seattle, Wash., has been appointed chief draftsman of the Tacoma Railway & Power Company, Tacoma, Wash.

G. F. Pfleger, of the United States Electric Company, Los Angeles, Calif., is a recent visitor to San Francisco.

C. P. Bowie, engineer in charge of the San Francisco office of the United States Bureau of Mines, made an extended trip through the California oil fields in connection with various activities of the bureau being carried on in these fields.

Paul R. Miller, of the advertising department of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has been made district advertising manager of the company at Seattle, Wash.

Norwood W. Brockett, vice-president of the Puget Sound Power & Light Company, recently spoke before the Seattle Real Estate Association on "The Light and Power Industry in this district."

D. C. McClure, formerly electrical superintendent of the Public Service Company of Colorado, Denver, Colo., and since July 1, 1923, president of the Rocky Mountain Division of the National Electric Light Association, has been transferred to St. Joseph, Mo., where he will become general superintendent for Henry L. Doherty & Company. Mr. McClure was born in Cox-sackie, N. Y., May 31, 1890. Since his graduation from Rensselaer Polytechnic Institute in 1913, he has been in the employ of the Doherty company, with the exception of his term of service in the World War. Prior to his entering the army in 1917, he was assistant superintendent of the electrical department of the Denver Gas & Electric Light Company, which has since that time been merged into the Public Service Company of Colorado; upon his re-



D. C. MCCLURE

turn he rejoined the company as superintendent of the electrical and steam heating departments. He is a member of the American Institute of Electrical Engineering, Doherty Men's Fraternity, and a number of Denver organizations. Harry H. Kerr, who has been Mr. McClure's assistant for some time, has been appointed his successor, with the official rating of electrical engineer.

A. W. Copley and J. F. Peters, of the Westinghouse Electric & Manufacturing Company, San Francisco, Calif., recently spoke before the San Francisco section of the American Institute of Electrical Engineers on the subject of "Measurements of Surges in Power Transmission and Distribution Lines."

George C. Tenney, managing editor of the Journal of Electricity, is on an extended trip to Portland, Ore., Seattle, Wash., and other Northwestern points. While in the north Mr. Tenney will visit several industrial plants as well as jobbers, central stations and contractor-dealers.

Oliver E. Sholders, sales engineer in charge of domestic applications, of the Pacific Gas and Electric Company, San Francisco, Calif., has resigned, effective March 1, and will take a vacation of several weeks.

H. A. Cram, representative in California, Arizona and Nevada for Landers, Frary & Clark, New Britain, Conn., has just returned from Los Angeles, Calif., to his offices in San Francisco.

Walter J. Dennis, of the Northwestern Electric Company, Portland, has recently been appointed to be assistant to L. T. Merwin, vice-president and general manager of the power company.

Percy Booth, vice-president and district manager of the Edison Electric Appliance Company, Ontario, Calif., and Ray W. Turnbull, assistant Pacific Coast sales manager, at Portland, Ore., visited Spokane on Feb. 21 in connection with general sales matters.

Burton Y. Gibson, Pacific Coast representative of the Walker & Pratt Manufacturing Company, Boston, Mass., is spending some time in the Northwest. He has already visited Seattle, Wash., and Portland, Ore., and will also take in Spokane, Wash., Boise, Idaho, and Salt Lake City, Utah.

R. E. Jerauld, who for the past seventeen years has been in charge of the central station and industrial business of the Salt Lake City, Utah, office of



R. E. JERAULD

the General Electric Company, has just been transferred to the Arizona territory with headquarters in Phoenix, where he will be resident agent of that company. The reorganization of the General Electric Company in the southwest territory, which occurred Jan. 1, placed the western portion of Arizona under A. S. Moody, manager of the Los Angeles, Calif., office.

A. E. Littler, for several years manager of the Sacramento, Calif., office of the Western Union Telegraph Company, has been made city superintendent of that company in San Francisco. Mr. Littler succeeds W. R. Edmonson who resigned to enter the real estate business.

A. E. Carroll, formerly with the Atlantic-Pacific Sales Company, San Francisco, Calif., has been appointed Pacific Coast district sales manager for the Rutenber Electric Company, Marion, Ind. Mr. Carroll will have offices and sample rooms in the Sharon Building, San Francisco.

George Kidd, president, and A. T. Goward, vice-president, of the British Columbia Electric Railway Company, sailed on February 13 for Naples, Italy, and will spend a vacation in Europe. They will visit some of the important recently constructed hydroelectric plants. Mrs. Kidd and Mrs. Goward accompanied their husbands.

A. D. Smith, purchasing agent of the Utah Power & Light Company, with general offices at Salt Lake City, Utah, has been elected president of the Purchasing Agents' Association of Utah. The following additional officers were also elected: Vice-president, S. L. Sorensen, purchasing agent of the Amalgamated Sugar Company; Secretary, T. George Wood, purchasing agent of the Utah-Idaho Sugar Company; Directors, A. K. Bell, purchasing agent of the American Smelting & Refining Company, and W. H. Lovsey, purchasing agent of the Utah Oil Refining Company.

B. R. Nichols, purchasing agent of the Tacoma, Wash., city light department, has been named chairman of the committee representing the electrical industry in the proposed Own-Your-Home Exhibit to be staged in Tacoma April 7-12.

J. C. Davidson, manager of the electrical department of the Hendrie & Bolthoff Manufacturing & Supply Company, Denver, Colo., heads the committee arranging an entertainment for the members of the Electrical Cooperative League in that city and which is scheduled for April 4.

Robert Arnold, test engineer from the laboratories of the Commonwealth Edison Company, Chicago, Ill., is on a leave of absence to the Coast, and has been spending some weeks in San Diego, Calif. He gave an interesting talk to the San Diego Electric Club on Feb. 26, on the principles of radio transmission.

R. R. Robley, operating engineer of the Portland Railway Light & Power Company, returned to Portland with his family on February 23, after spending nearly seven months at the Schenectady works of the General Electric Company. An exchange of engineers was arranged between the power company and the big manufacturers, and H. M. Rankin of the central station engineering department of the General Electric Company, exchanged places for a seven months period with Mr. Robley. Both have now returned to their former positions. This exchange will be of great benefit to both companies and to the Portland Railway Light and Power Company especially, as this company has recently installed a large amount of new switching and relay equipment requiring special knowledge in adjustments.

G. H. P. Dellman, recently elected president of the San Diego Electric Club, was born in Milwaukee, Wis., Oct. 22, 1882. It was while he served in the U. S. Navy, from 1898 to 1903, that he received his technical training in electrical engineering. Mr. Dellman came to California in 1903, and was with the test department of the Southern California Edison Company for a year. From 1904 to 1911 he was in charge of the test department of the Los Angeles Gas & Electric Corporation, whence he went to the General Electric Company as sales engineer. In



G. H. P. DELLMAN

1919 he was made manager of the Escondido (Calif.) Mutual Water Company, with which company he remained until 1920 when he joined the San Diego Consolidated Gas & Electric Company. With this company he was first associated with the electric distribution department, but for the past two years he has been the lighting sales engineer of the commercial department. He has been successful in inaugurating an extensive program of modern street lighting in the city of San Diego. This system is now being installed. Mr. Dellman has been an active member of the Electric Club ever since its foundation.

Malcolm H. Carpenter, formerly manager of the San Francisco, Calif., branch of the Mine and Smelter Supply Company, Denver, Colo., has taken over the management of the El Paso, Texas, branch of that company.

Irving B. Boyer, formerly with the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., who some time ago joined the sales force of the Mine and Smelter Supply Company, Denver, Colo., as a lamp specialist, has been made a general salesman for that company, handling all of their material.

Obituary

Nicholas J. Hullin, for several years superintendent of construction for the Pacific Gas and Electric Company, Sacramento, Calif., died in that city on Feb. 25. Mr. Hullin had been ill for several months.

Trade Outlook

San Francisco

Business, in general, is holding up well. Wholesale buying is on a conservative basis, with more activity in spring merchandise. Recent rains in the northern part of the state have improved conditions. Trade in staple groceries is reported good. Steel products are in fair demand, with prices showing an advancing tendency. A good volume of canned and dried fruits is being exported to Europe, and an increase of ocean traffic is reported. The lumber demand has slackened, but good business is being done in agricultural implements, in spite of rather unfavorable weather conditions, and further activity is anticipated. Exports in this line to Japan have fallen off somewhat but are expected to improve.

Some brisk trading has been done recently on the mining exchange, due to report of a rich ore strike in the Comstock district. News dispatches indicate considerable activity around Tonopah also.

Building activities continue to increase. Permits for February totaled \$3,912,166, a gain of 19 per cent over last February. This makes for good demand in electrical equipment and appliances. Bank clearings for the month amounted to \$663,500,000, an increase of \$73,100,000 over a year ago.

Los Angeles

Healthy trade conditions in Los Angeles are reflected in the February postal receipts as reported by the post office department, the total figures being \$586,514.80 as compared with \$483,076.59 for the corresponding period of last year, or an increase of approximately 21 per cent.

A new record in building was established during the month of February when 5,344 permits were issued with a valuation of \$16,083,412. This is an approximate increase of more than \$4,000,000 over the same period last year when permits to the amount of \$12,080,310 were filed.

Retail electrical sales show a slight increase over the preceding two weeks. The volume is better than that of the same period a year ago, though it is not quite up to expectations. The wholesale electrical business has experienced very fair business during the past two weeks, this in a measure being due to the building construction under way.

Money for investment and building, as a rule, has been somewhat "tight" during the past few months, but shows a tendency to become easier. Labor conditions are good, though there is quite a bit of unemployment due to the inrush of laborers at this season of the year.

Portland

Portland's bank clearings in February, 1924, exceeded by 10 per cent those of any February in the history of the clearing house. During the same month the postal receipts increased 28 per cent over February of a year ago.

There is much building activity in residences and a fair amount of industrial construction, office buildings, etc. Permits for January and February this year far exceed those of 1923, which were the greatest in the history of the city.

The volume of shipping during January and February showed a gain of 25 per cent over the corresponding figure for 1923. This increase was due to the foreign and coastal trade, as the intercoastal trade showed a slight drop.

Lumber production continues at a good pace, with orders and shipments somewhat behind production. The California and Japanese markets are dull temporarily, but buying is quite active on the Atlantic Coast. Lumber trade in the Middle West was relatively quiet during the past few weeks, due probably to the bad weather that has prevailed in those sections.

Seattle

Construction in all lines is showing very rapid increase, after an unusually active winter period, and prospects for the early spring and summer are especially encouraging.

The lumber industry reports that the Atlantic seaboard trade is the bright spot in coast lumber circles. Weakness in Japanese sizes due to heavy offerings was the outstanding development in the export trade.

Electrical men state that the volume of buying has held up well during the past two weeks, with stocks in good shape and shipments moving freely. House-wiring devices are selling in volume, due to the large number of new homes contracted for. During the past week permits for 1,000 new residences were issued, and the majority of these homes were of the best bungalow type, modernly equipped. Demand for motors and large equipment has been active. Electric range sales volume has shown marked increase during the first two months of the year, due to continual sales work of the local firms and the many demonstrations throughout the city.

Spokane

With the continuation of remarkably mild weather, activity in all lines is becoming greater. A number of new dwellings and seven new commercial garages are announced, and men handling building supplies are confidently expecting an unusually good year.

One of the larger lumber mills went on double shift March 1, and plans on cutting 60,000,000 ft. this year. The Western Pine Association has announced that the cut of 74,000,000 ft. for January exceeded that of the same month in 1923 by 15 per cent, and that shipments in January were the largest since May, 1920.

Deliveries of live stock are running well above those of previous years, and the local packing plants are running at good output.

Mining activity in the Coeur d'Alene district is pronounced, owing to high

prices for lead and zinc. The Hecla Company has placed its new plant in operation and constitutes an important factor in production.

The Washington Water Power Company has already placed large orders for copper insulators and other equipment necessary for its program of line construction, already announced in these columns.

Plowing is under way in the Palouse and Big Bend wheat districts, and excellent crops are anticipated.

The general feeling among all business men is extremely optimistic.

Salt Lake City

As farming is one of the most important industries in this section, the fact that the value of farm crops in Utah for the year 1923, exclusive of truck and canning varieties, is estimated at \$36,610,000 as compared with \$31,286,000 for the preceding year, is of considerable interest in connection with the trend of general business conditions. It is expected that the present year's figures will exceed those of 1923.

In the copper mining industry figures for 1923 show that the Utah Copper Company finished the year 1923 with greater production and profits than in any calendar period since 1918.

In Salt Lake City building permits in February were 64 in excess of those for the same month last year, and an extensive building program for the succeeding spring and summer months is anticipated.

Electrical dealers are concentrating their efforts during the month of March on the sale of washing machines. The Utah Power & Light Company reports a considerable increase in sales already for the month as compared with the same period last year.

Collections continue to improve, there is very little unemployment, and all indications are that the outlook for continued betterment of business conditions is exceptionally good.

Denver

Some of the slack noted in February business has been taken up and a sustained activity is again noted in basic lines, due allowance being made for other seasonal conditions.

Agriculture is preparing for big production this year, influenced by excellent soil and moisture conditions and by improvement in the position of leading crops, notably corn, sugar beets, potatoes, truck and dairy products. Winter wheat acreage has been reduced, but the growing condition at this time will, if maintained, provide a good yield.

Building operations, although less in volume than for the same period last year, still continue on a larger scale than in the other cities of the region and federal reserve district. February topped January by \$140,000 with 586 permits totaling \$1,532,350. Bank clearings dropped a trifle at \$117,933,758.

There is no marked fluctuation in the volume of electrical business, due principally to industrial development. This is especially true in the Wyoming oil fields where a number of large producing companies are making extensive pumping and power improvements.

Jobbing lines are steady, except in copper products where a gradual price rise is being noted. Closely competitive quotations are being made.

Journal of Electricity

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April 1, 1924

San Francisco



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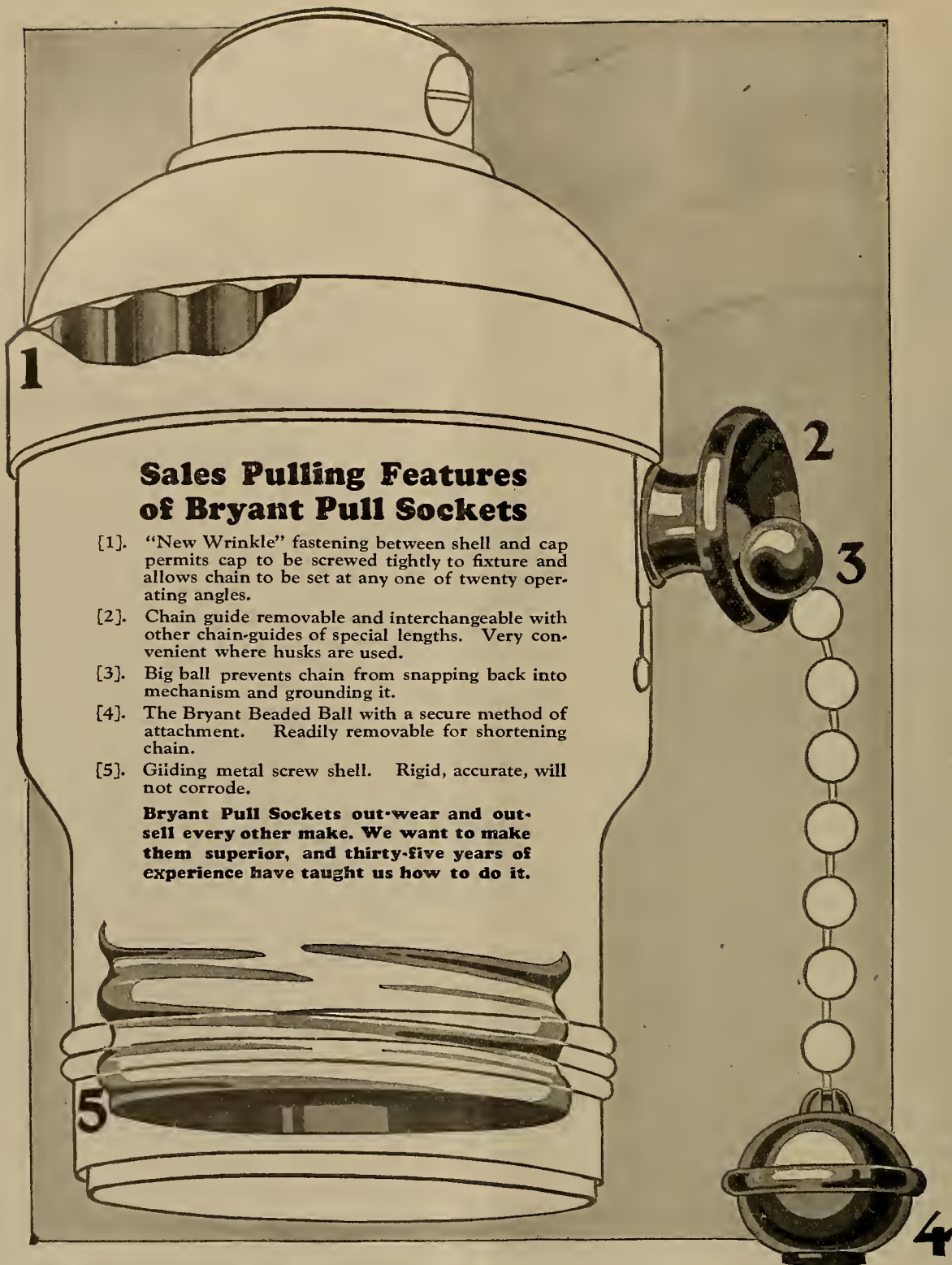
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Reprints Ready on Erickson Bill Comment

ON another page of this issue appears the full text of the "Erickson Bill," which has been proposed as an initiative measure to be presented to the voters of the State of Washington this fall. It is worth while reading this document in order to appreciate just what it is the electrical industry is called upon to face. This movement is not a problem of the Northwest alone, nor of the Northwest and California—if such a measure were actually passed over the protest of the more conservative and clearer-sighted voters in Washington, it would not be long before similar measures would be up in every state in the Union. Nor is it the problem of the electrical industry alone. Every public utility, whatever its nature, faces the same potential danger—in a hardly less direct way, every business must decide before it goes much farther whether it is to be compelled to meet destructive competition by the state. How imminent such a danger is may be judged by the experience of the insurance companies in many sections of the country in the matter of state employers' insurance and by the banks in North Dakota.

Both the insurance companies and the railroads have appreciated the prospect which they face and are taking steps to counteract the current tendency toward the socialization of industry. The only reason why they are not now cooperating more closely with the electrical industry is because they are not kept fully informed as to just what the situation is.

With the thought that there will be many interested in this Washington bill who may not see it in the columns of the Journal of Electricity and to whom our readers may wish to send copies, we are saving the type and shall be glad to furnish reprints of the measure and the comments of this paper upon its dangers, at a nominal charge.



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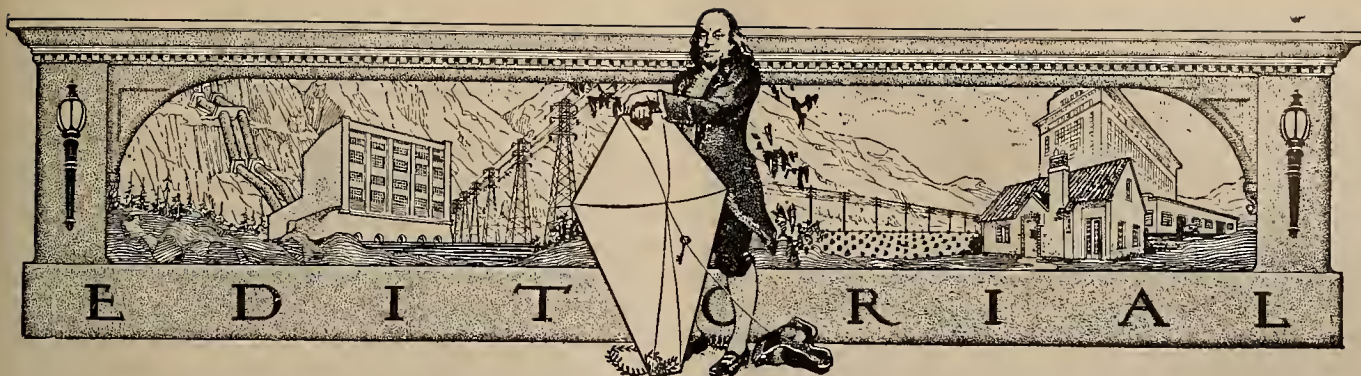
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Exterminating the Public Ownership Mosquito

WILLIAM JENNINGS BRYAN, malaria and mosquitoes used to be looked upon as unavoidable seasonal phenomena. We have done away with the mosquitoes—and with them the malaria, but in their place we have acquired a series of other troubles which occur periodically at the time of the meeting of our state legislatures or at such times as opportunity is given to place initiative measures before the public. Among this group we have grown familiar with the single taxer, the anti-vivisectionist and the chiropractor—and we are now getting used to the government ownership advocate as a yearly occurrence.

THE State of Washington is this year facing an attack of public ownership fever. It takes the form of the so-called "Erickson Bill," the substance of an early draft of which is presented on another page of this issue. This is an initiative measure which proposes to make possible the formation of "utility districts" throughout the state, whose purpose shall be to undertake the generation and sale of electric energy. Its faults are those common to all such measures—it provides for a state monopoly with almost unlimited powers of incurring indebtedness, meeting losses by taxation and arbitrary and discriminatory rate fixing, and it leaves no recourse to the public in case these powers are abused.

WE have published the text of this proposed measure in full, together with comments upon its dangers, because we believe that any such attack upon the principles of individual enterprise, wherever it occurs, is a matter of active concern to every section of the country. The electrical industry is too prone to fight its individual battles alone.

Every large business has its public relations problem and its organized department to meet the demands of publicity and the establishing of good will. The tendency is for each company to make its own plans and to resent somewhat ideas which originate outside its own ranks. This attitude is perhaps inherent in the very individualism of private ownership which we approve—but it is the weakness upon which the public ownership advocate trades most.

THE electrical industry must form a concerted plan of campaign and act together. Very much the same line of argument and the same political tactics must be met in every case. The Ontario Commission, the city system of Seattle, Tacoma and Los Angeles will be misquoted in every public ownership fight—and so long as the question appears on the ballot in any part of the country, the echoes of debates argued out during 1922 in the California contest will be heard. The fact that the points made at that time by those advocating public ownership were met in every case and that the voters were so convinced of their fallacy that they defeated the measure 2 to 1 will not hinder this resurrection.

IT appears that the time has come for a very definite co-ordination of effort, not only between power companies in the various local centers but between California and the Northwest—or any other points affected. The Journal of Electricity believes that the matter should not be allowed to drift longer. In the meantime the news columns of this paper and its editorial comment are the best available means of keeping in touch with the events and policies worked out in the different sections of the Coast.

Where Are Electrical Dealers to Come From?

IT seems to have been the case in the past that electrical contractor-dealers, like Topsy, "just grewed." They have come from many walks of life and from many other businesses. There has been no established line of progress into this important branch of the industry. Unfortunately, in many cases there has been no advance preparation. This has reacted in expense, discomfort and dissatisfaction to the consumer; in disadvantage to the manufacturer and jobber—because of improper sales methods—and in direct loss to the central station owing to restricted use of electrical equipment and the attendant reduction in possible revenue. Many contractor-dealers have been fostered or sponsored in their business by jobbers and possibly by manufacturers.

Wherever there seems to be a need for additional outlet of this nature and where a choice is deliberately made, would it not be better to support the entry into this field of a trained salesman; one who knows merchandise and materials, who knows something of buying and selling, of turnover and discounts, of credits and collections? Such procedure would mean the establishment of a firm the head of which was already familiar with the electrical technicalities and was also well versed in the general conduct of a merchandising business. It would seem that the percentage of failures should be materially reduced and the loss to jobbers and manufacturers written in smaller figures. Consumers would receive more intelligent attention and the satisfaction of electrical application would be materially increased.

Why Discriminate Against Electric Trucks?

AT the last session of the California State Legislature, a 2c. gasoline tax was imposed for the purpose of raising revenues for the upkeep of state highways. At the same time, the registration fee on all classes of vehicles was reduced to a nominal amount, intended to cover merely administering expenses of the department. For commercial vehicles an additional weight tax must be paid, varying from \$5 to \$40, depending upon the unladen weight and the type of tire used. This left a disparity in payment between electric and gasoline trucks and apparently with an eye to evening matters off, a special registration fee of \$50 was fixed for electric trucks.

Obviously, this was intended to balance the gasoline tax—but in reality it works a marked injustice against the electric vehicle. Upon a basis of 2c. per gallon for gasoline, it would take a larger mileage per day than the cruising radius of the average electric truck to make up the equivalent of \$50 worth of travel. Taking the figures of actual performance, the disparity is even greater. With the smaller trucks it may be figured that a gasoline machine pays something like \$7.50 for the same service which costs the electric truck \$50 per year. In this connection, it is pointed out that under the King tax bill, electric current is already taxed to meet state expenditures

to the extent of 7½ per cent of the gross earnings of the power companies, a factor which amounts to a figure of from \$9 to \$20 per year.

Looking at the matter from the viewpoint of charging vehicles in proportion to the damage which they do to the highways, which is the theory underlying this type of legislation—it becomes obvious that instead of being penalized, the electric truck should be favored. It operates at a steady and comparatively low speed, avoiding impacts which are so destructive to highways. Furthermore, owing to their limited cruising range, electric trucks are seldom used on the state and county highways, but are confined very largely to city streets.

It is understood that electric truck owners will make payment of their 1924 taxes under protest and that test action will be brought against this section of the Vehicle Act. Certainly there is no reason for this unfair discrimination—and some step should be taken to see that in the future the electric truck will receive the encouragement that it deserves.

The Americanization of Ole Hanson

AMONG the colorful figures in public life during the past decade, Ole Hanson, former mayor of Seattle, stands out for the vigor of his personality. Some will remember him for the story that was told of his facing the verdict of "not six months to live" by packing up his belongings and his family and walking most of the way across the continent from Wisconsin, incidentally regaining his health en route. Others will remember his prompt action in ending the general strike and labor troubles of Seattle while he was mayor of that city in 1919. Some know only that during the same term the Seattle street railway lines were taken over by the city and the field of the city lighting bureau was extended by the undertaking of the extensive Skagit River project. Ole Hanson fought for the measures he approved and at the time he was a vigorous advocate of municipal ownership.

Today he is in the real estate business in Los Angeles. And he will tell you frankly that his experiences have led him to change his mind and that he does not believe that any city should be engaged in the utility business. He has tested it out and he knows that municipal ownership is wasteful, it is inefficient, it increases the tax rate and it opens up a rich field for individual political gain. His personal statement will be found on another page of this issue. It is worth the reading.

Executives, Democracy and Public Relations

INDUSTRIAL democracy embodies a beautiful idea, especially the democracy part of it. The spectacle of the lion and the lamb lying down together, so to speak, appeals to the sentimental idea that all men were created free and equal, although, on its practical side, this doesn't seem to work out, somehow. The electrical clubs in Western cities have had a genuine humanizing influence with respect to creat-

ing an atmosphere of mutual tolerance, even respect, between business competitors. The mellowing influence of the round table, the relaxation from business cares afforded by the luncheon hour and the twenty-minute speaker, have an effect upon the individual the value of which can hardly be overestimated.

But—and it is a sizable “but”—from what class of electrical men is the average attendance at electrical luncheon clubs recruited? There is no more than a sprinkling of the higher executives in semi-regular attendance. This is especially true of the central station class. Are they not, therefore, overlooking an opportunity to cement their public relations within the collateral branches of their own industry? Surely there would be no sacrifice of dignity for some of the odds and ends of assorted vice-presidents, or even a president or two, to sit down at the table next to a jobbers’ salesman or a contractor-dealer, for instance, and do it once or twice a month, and swap yarns in a friendly way. They are busy men, no doubt, but busy as they are, could they put in an hour or two each month to a better advantage?

How are we going to make an industrial democracy without democrats?

Portland Makes

Convenience Outlets Compulsory

IN the 1924 Electrical Code published by the Department of Public Works of the City of Portland appears the following clause:

Approved receptacles for attachment plugs, connected directly to the circuit wires by not smaller than No. 14 wire shall be provided in parlors, living rooms, dining rooms and kitchens. A light outlet shall be so placed as to illuminate the front of every furnace or heating boiler. These requirements apply to all buildings which are to be wired for electric light.

In a footnote it is explained that it is the purpose of the above rule to prevent so far as is possible unlawful and dangerous extensions of flexible cord in order to obtain outlets that are nearly always needed.

This is a new step in municipal regulation and marks official recognition of modern conditions in the home. Electric appliances are in such general use that there is hardly a family that does not use its electrical outlets for purposes other than lighting. The Portland code frankly recognizes this fact and specifies that proper provision shall be made to care for portable lamps and for labor-saving devices. So far as we have been able to learn, this is the first instance in which convenience outlets have been compulsory in a city code.

A Booklet for

Electrical Salesmen

PRESUMABLY the washing-machine salesman knows all about washing machines and can answer any legitimate question on the subject. Without examining too fully into the complete wisdom of the specialty salesman, it nevertheless remains that there are a great many people selling electrical equipment of various sorts who are not specialists on that particular appliance and who are apt to find themselves embarrassed by a lack of knowledge in the

face of inquiring customers. This ignorance is not confined to those who meet the public in a direct sales capacity, but is even more widespread among the rank and file of the electrical industry who, although they never make a direct sale, are nevertheless looked upon as experts in their field and are called upon to advise in the matter of electrical purchases. Try asking the electrical man seated nearest to you how the cost of operating an electric water heater compares with the use of gas equipment or whether it pays to heat a house electrically—and unless he happens to be a specialist in that line, figure out for yourself why the public is skeptical on these subjects.

Feeling that a fundamental knowledge of those subjects that will enable him to answer the usual questions asked by the customer is an essential part of the equipment of every electrical man, particularly of every electrical salesman, the California Electrical Cooperative Campaign has authorized the compilation of a little booklet to satisfy the need for this information. This is a praiseworthy undertaking and one which, if it can be carried out effectively, will meet a real need. Every assistance should be given the committee in charge in compiling this book—and after it is published, it should be put in the hands, not only of those who conduct Electric Homes, but it should be furnished also to electrical retailers in every field for the use of themselves and their staffs.

Reducing the Costs of

Hydroelectric Development

THERE never has been a failure of a simple arch dam. This means that there is no way of knowing what factor of safety exists in such structures as are now erected and whether it might not be possible to reduce the thickness and hence the cost without in any way affecting the safety of the dam. In view of the fact that dam costs often make up more than half the original investment in hydroelectric construction per horsepower, it is a matter of vital importance in water power development to learn whether such a saving is possible. Western power companies are watching with interest the experiments contemplated by the committee of the Engineering Foundation on arch-dam investigation.

Under the direction of this committee, it is planned to erect an experimental dam on Stevenson Creek, about 60 miles from Fresno, Calif., that will be tested under various conditions of operation and finally loaded to destruction. The site chosen is most favorable for such an experiment and careful plans have been made—all that is required is the necessary funds to go ahead. It is estimated that about \$60,000 will be needed for carrying out this test, of which \$25,000 has already been subscribed by the Southern California Edison Company, additional donations bringing the sum at the last report to \$30,000. It is most desirable that these tests be carried out at as early a date as possible and it is to be hoped that those interested in establishing the results of such an experiment will make prompt response to the appeal for contributions.

CURRENT COMMENT



Mark Twain, in one of his books on the Mississippi, put in a word in favor of statistics. He had done a little arithmetic on the basis of some figures given

While Others Use Statistics
on the yearly lengthening of that river and calculated that a century or so from now the stream would be so long that it would extend out over the Gulf of Mexico like a fishing pole, whereas some thousands of years ago, its mouth must have been several miles the other side of its source. "Thus," said he, "may we reap a rich reward of fancy from a very small investment in fact."

The quotation suggests the process of thought which led to the following editorial recently published in the San Francisco Examiner under the title, "Figures Show Grip of Monopoly in California":

California is acknowledged to be the one State of the Union where electrical development has attained its highest mark.

More than one-fourth of all America's hydro-electric power is developed and sold within our borders.

Yet something is wrong—not with the power-output itself—but with the method by which this electricity is marketed to the people.

H. E. Grant, local engineer, calls attention to interesting figures just issued by the United States Department of Commerce, showing very clearly the nature of that wrong.

Here are the rock-bottom facts, covering the six-year period 1917-1922 in California:

Output of current increased 58.3 per cent.

Number of consumers increased 64 per cent.

Cost to consumer increased 102 per cent.

In other words, though the production of electricity increased very remarkably, the number of consumers increased yet more rapidly—and each consumer, therefore, used less power in 1922 than in 1917.

And this reduction in the individual use of electricity is explained by the last figure, which shows that the cost of power in the six-year period rose nearly twice as fast as the production.

And this in the State that lies right along the base of the Sierra Nevada range, the greatest and most economical water-power machine in the world, outside Niagara!

Excessive rates furnish the reason, of course, why the average consumer used less electricity instead of more, in the midst of plenty. With electrical production increasing faster than the population, the individual consumption should have gone up. But the high rates interfered. . . .

The private power companies are killing the goose that lays the golden egg. They are charging so much for electricity, in the world's richest electric-production field, that the average use of current is being cut down instead of stimulated.

Electric power must be made cheap—its employment for heating, cooking, lighting and factory-driving must grow rather than diminish. Public ownership is the only thing that will ever accomplish this. . . .

The piece is a masterly example of the misuse of statistics. We pass over such unimportant inaccuracies as the exaggeration of California's water power resources. The figures taken from the government report are correct. That is to say, they

were correct in the government report. The third statement that the "cost to consumer" had increased "102 per cent" does not mean what it says. What had increased 102 per cent was the gross income to the power company. In view of the fact that the number of consumers had increased 64 per cent in the same time, this means something like a 20 per cent increase in bill to the average consumer. Note that this does not mean a 20 per cent increase in cost. The little joker in the calculation is the fact that industrial, commercial and domestic consumers were lumped together and inasmuch as rates vary for these services, it is impossible from this figure to determine whether what actually occurred was that the consumer used more lighting service proportionately to power, or whether rates were actually raised. The fact that the number of consumers increased more rapidly than did the output of current, indicates that the former was the case. Here, too, entirely false deductions are made. The only conclusion which can be properly drawn from the figures presented is that the number of residence consumers had evidently increased at a greater rate during the six years in question than had the users of industrial power.

As a matter of fact, the consumption of electricity by the average home in California has greatly increased during the past six years. The Journal of Electricity not long ago conducted a survey of electrical conditions on the Pacific Coast, from which it was shown that the use of electricity in the average home in California had increased from 324 kw-hr. in 1915 to 374 kw-hr. in 1920. Rates in this state are not exorbitant—in fact, they are among the lowest in the country. Electricity in the West is cheaper than in any other section, the figures for 1922 being 1.57c. per kw-hr. generated on the average in the Pacific and Mountain states as against 2.82c. for New England and 2.17c. per kw-hr. for the United States as a whole. As a result of this advantage in rates, the average Westerner uses two and a half times as much electricity as his Eastern brother. These figures are for all classes of service—the discrepancy in favor of the West would be even greater were domestic use of electricity alone considered.

It seems hardly necessary to note that while electric rates increased slightly over the war period, they did not in any measure keep up with increases in other commodities, nor to mention that since the 1922 figures quoted there have been general decreases in rates for electric service. It is enough to indicate the large ingredient of "fancy" mixed with the slight investment of fact in the editorial and to

point out that the sample is typical of the questionable use made of statistics by those who would prove the difficult case for government ownership.

Failure to consider the resources necessary for the maintenance of service is often the reason for public complaint of rates charged by utilities. The devotion of employees to duty and the measures necessary to maintain service have been characterized as "a service without price." The Mountain States Monitor in a recent editorial calls some of these things to the attention of the public. The paper says:

Service
Without
Price

Despite fire or storm or flood, a telephone operator sticks to her switchboard. A lineman risks life and limb that his wires may continue to vibrate with messages of business or social life. Other telephone employees forego comfort and even sacrifice health that the job may not be slighted.

It is right that the public should receive this type of telephone service, that it should expect the employment of every practical improvement in the art, and should insist upon progress that keeps ahead of demand. Telephone users realize that dollars can never measure the value of many of their telephone calls. The public wants the service, and, if it stops to think, cheerfully pays the moderate cost.

In view of the recent testimony on the part of representatives from the city of Los Angeles before the Senate Boulder Dam investigating committee to the effect that large sums of money were saved the citizens of that community through the operation of the city power and water departments, it is interesting to note the government census figures on comparative costs of city government in different parts of the

Municipal Power
and Costs of
City Government



Ding in Fresno, Calif., Republican.
Isn't it about time the management quit issuing those things?

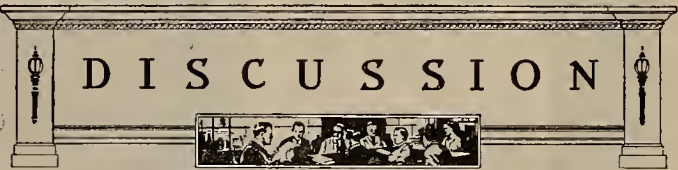
United States. The P. G. and E. Progress points out that Detroit leads all American cities in per capita cost of government, that Seattle is second and that Los Angeles stands third, the actual figures being \$120.30 for Detroit, \$110.71 for Seattle and \$99.34 for Los Angeles per inhabitant.

Why these three cities excelled in the spending of taxpayers' money was not discussed by the census bureau, but the power company publication explains that:

Detroit owns a municipal street lighting plant and bought a street railway system and raised the fare in an effort to make municipal ownership pay.

Seattle owns a street railway that cost \$400,000 in three months last year, and also owns a light and power system.

Los Angeles owns a light and power system.



Skagit Accounting System Not Separate
from City Bookkeeping Department

To the Editor:

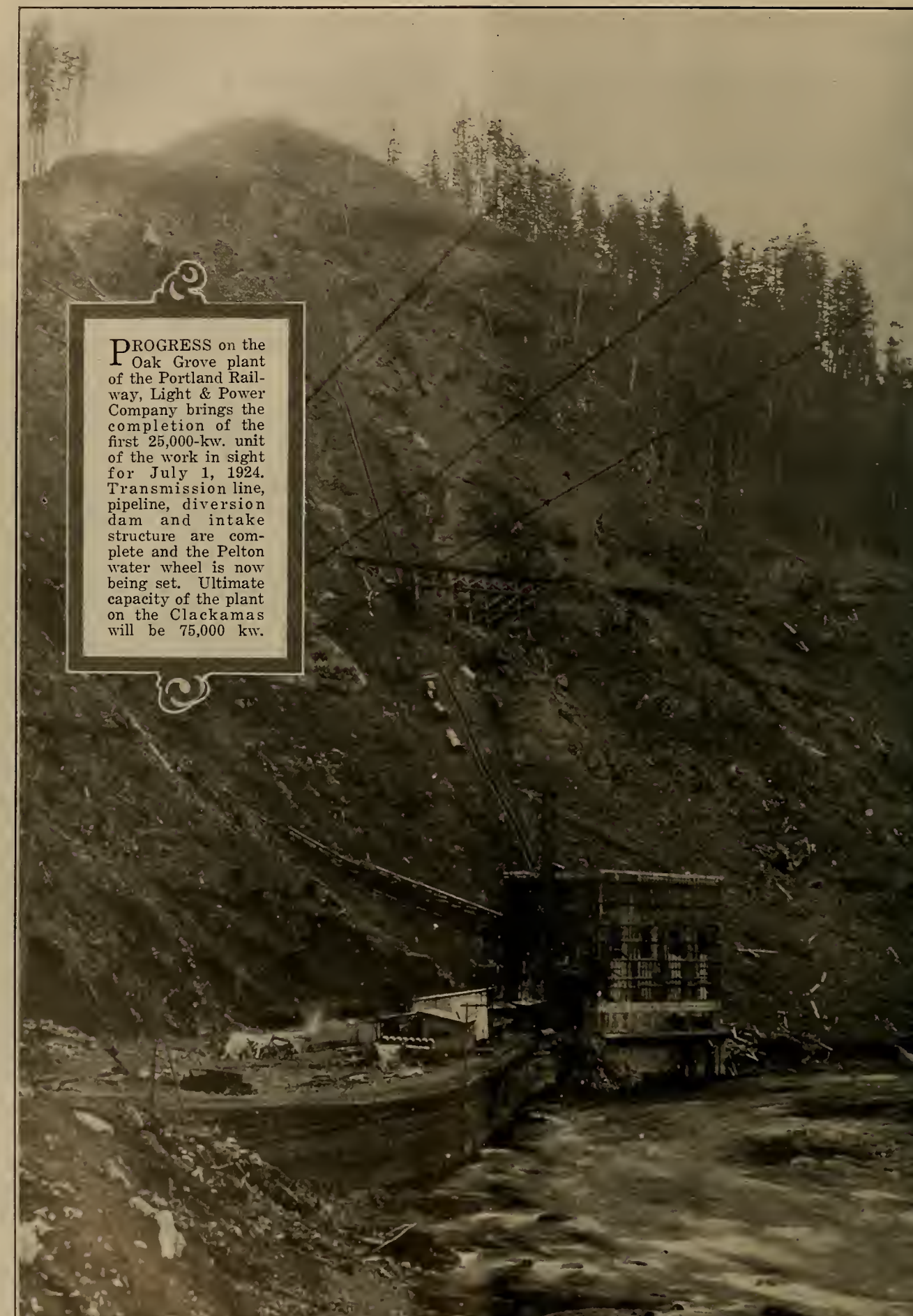
Sir: I would like to call your attention to an article appearing on page 180 in the March 1 issue, in which you state that the Skagit accounting system has been kept separate from the Seattle bookkeeping department and the City's accountants have had no access to the Skagit department's books. This statement is not correct and not true and I think your paper should correct the impression that this might give to those who are not familiar with the actual condition of affairs. The following gives you an idea of how the Skagit bills are audited and the accounts kept.

All bills and estimates are passed by the Chief Engineer of the Skagit River Development and then sent to the City Engineer for his approval and for the approval of the Board of Public Works. The Claim Sheet is then made out, which goes to the City Comptroller and then all bills and estimates are passed to the Auditing Committee, which consists of the Mayor, the President of the City Council, the Chairman of the Finance Committee of the Council and the City Comptroller. After this committee has passed on these bills and estimates they are sent to the City Comptroller for payment and he issues the necessary warrants on the City Treasurer. The Skagit office does not have the handling of any funds, nor the final say on the paying of bills and estimates. All vouchers and estimates are filed with the City Comptroller just the same as are the estimates and bills of any other department and the City accountants not only have full access to all papers but actually have these papers on file in their office.

No books of any kind are kept outside of the City Comptroller's office except a memoranda set of books which are kept in the Skagit office and merely serve for quick reference.

From the above you can see that the Skagit Accounting System has not been kept separate from the City bookkeeping department.

C. F. UHDEN, Chief Engineer,
Skagit River Development.



PROGRESS on the Oak Grove plant of the Portland Railway, Light & Power Company brings the completion of the first 25,000-kw. unit of the work in sight for July 1, 1924. Transmission line, pipeline, diversion dam and intake structure are complete and the Pelton water wheel is now being set. Ultimate capacity of the plant on the Clackamas will be 75,000 kw.

Why I Do Not Believe in Municipal Ownership

An Interview with Ole Hanson

WHAT do I think of municipal ownership? Such ideas as I have are probably no different than those of thousands of other business men who have a grain of common sense. Theoretically, municipal ownership is absolutely right. So, too, are the League of Nations and Prohibition. Practically—well, they have their drawbacks.

No one can argue against the theory of municipal ownership. Interest rates for municipal bonds are less; they are tax exempt; there is a feeling that in all municipal bond issues the city is back of the securities. Municipally owned utilities pay no taxes. They can obtain franchises at no cost. Condemnation proceedings for them are a simple matter. Run properly, municipal enterprises should be able to sell their product cheaper than private companies run for profit.

But do they do this? In most cases, I do not think so. The reasons are obvious.

In the first place, municipal properties are immediately removed from the tax roll, thus increasing the burden upon the taxpayer in general. Every taxpayer shoulders a heavier burden. So, too, indirectly, does every citizen, whether or not he is benefited by municipal ownership of that particular city-operated enterprise. The purchasing power of every dollar he spends for food, clothes, rent and entertainment is reduced by that fractional sum necessary to make up the deficit in the public treasury caused by the loss to the city of the taxes formerly paid by the private company.

The loss of efficiency in the operating staff resulting from municipal ownership is a well recognized phenomenon. Private companies will pay for brains, and brains are one of the chief requisites for the successful operation of a business as technical and intricate as a public utility. The brains can be Republican or Democratic, so far as the public utility is concerned, just so the knowledge and performance

are there. Municipal enterprises often will pay a higher rate than the current market price for hands, as evidenced by the support given them by labor. Municipal or government ownership is synonymous with more jobs, more pay, less work. They will not

pay, however, for brains. I have seen cities with a \$20,000,000 street car system, municipally owned, refuse to pay more than \$5,000 a year for its head! Ridiculous, of course, but remember that salaries are fixed in municipalities not on account of what a man can earn, but on what the public thinks is a fair wage.

In the development and construction of public works, contractors are notoriously delinquent. They depend upon the municipality to change their contract and not enforce its penalties. Few, if any municipal utility projects are ever constructed within the original estimates. Political promises are made, an undertaking started and from that day on, the cry is for "money, money, money." "Another million and the job will be completed," is the plea. That million is voted, and another, and still more. Usually such an alarming total is built up that the public refuses to vote additional funds and the municipal project is left high in the air. This has happened in more than one instance.

Every man's job in a private company depends upon his making good. Either make good or leave, is the doctrine. This

may seem crude but it is very efficacious. In a municipality the job often depends on political control, influence or votes. Because of this, municipal enterprises are usually over-manned. There are more men than jobs. Two job-seekers are placed on the payroll when one could do the work. There is a woeful lack of efficiency. The public pays the bill.

The public itself does not understand technical matters. Voters, as a mass, are more likely to listen to the oratorical spouting of a politician than the hard facts of a business man. In the furore before



Ole Hanson

Former mayor of Seattle, under whose administration the street railway system of Seattle was purchased and the Skagit project was commenced, was once a strong advocate of public ownership. In this interview he tells, from the richness of his experience, why he does not believe in municipally owned public utilities.

[Photo by International Film Service.]

a municipal election, municipal business cannot be kept out of politics. We have had many demonstrations of the utter futility of mixing business and politics. Like oil and water, they do not go together.

The politician's business is a business of holding office. He is on the job from two to four years. What would you think of a private company that changed managers that often? The politician has no personal responsibility. His constituents—the voters—are notoriously lax taskmasters. In order to hold office he often sacrifices the vital interests of the municipality for his personal political gain.

The cause for the spread of municipal ownership is largely attributable to the selfish desires of these same politicians who see in the control of utilities an opportunity for more power. They are aided by certain misguided theorists who actually believe that it will work. Another factor in the present situation is the fact that the public has not yet recovered from the domineering acts of some of the public utility companies of forty years ago. What is needed is a stronger public conviction of the truth in the statement, "more business in government and less government in business."

Selling Smiles

By H. Austin Adams*

Playwright and Publicist

WE hear and read everywhere today the word "sell," and it seems to have been given a new meaning. Ideas are "sold." A campaign is "sold." Whether it is "courtesy" or anything else, we speak of it in terms of selling and we mean by that,—"convincing."

But it has not been many years since those two words "sell" and "sold" had quite a different meaning. You remember "a sell." "I've been sold" meant, not the receiving of full value, but that you had been sold a gold brick.

The public remembers these words in their old meanings and it is suspicious. Your task is to educate them to the meaning you use them in today.

Courtesy is the great lubricant in human relations. You must use courtesy and you must use smiles to conquer the friction of suspicion. But your

If you have something that is sincere, a service that is honest, then your courtesy has a real foundation.

Your campaigns are good. Your buttons and slogans bring you together as soldiers for a cause.



The suave smile of the sharper is not true courtesy.

You march shoulder to shoulder and the weaker is helped by the stronger. You regiment your purpose and when you meet the enemy, the sceptical public, you must face them with smiles which ring true to the heart.

No one in the electrical industry, it seems to me, should fear that his service to the public is unwanted, that there is no real demand for it. You are the forerunners of development and your great secret, electricity, is binding the world together, running the railways, lighting communities, is opening up lands, turning the wheels of industry. It is relieving everywhere the drudgery of mankind.

Let your smiles be smiles of friendship. Friendship, the friendship of the public through courtesy, elevates you.

To me, the life of every man is a tragedy, because I know from experience the struggles, the heartaches, the battles humanity fights. And if you come before me smiling through them all, you come before me radiant, for I can see your body is covered with scars, received in the struggle. So when you can smile, gentlemen, and exercise courtesy, you lift humanity up with you to a higher plane.



The smile from the heart overcomes any sales resistance.

courtesy must not be alone the courtesy of affability. It must be from the heart; and a button won't give it to you, nor a mere smile, nor a campaign, nor a slogan.

Your smiles must not be mere smiles, your courtesy mere suavity. They must not be empty things.

*Extracted from an address before the San Diego Electric Club.

Manufacturing High Voltage Insulators on the Pacific Coast

By A. W. Pride

Porcelain Section, Emeryville, Westinghouse Electric & Manufacturing Company

THE Emeryville Works of the Westinghouse High Voltage Insulator Company, now operating at its present maximum capacity, is located in a rapidly developing industrial center north of Oakland, California. One hundred men and women are employed in this plant, which is laid out to facilitate the manufacture of porcelain insulators by the most modern production methods by which the handling of the ware is reduced to a minimum.

Of the three principal raw materials used in the manufacture of high voltage porcelain bodies, feldspar of excellent quality is obtained from California deposits. The flint is obtained from Illinois and the clays are at present imported from England. Exhaustive research extending over the past two years at the ceramic laboratories of the Westinghouse company at East Pittsburgh and Derry, Pennsylvania, have proved that clays from California deposits are especially adaptable to high voltage porcelain insulator manufacture, and within the next few months a large proportion of the clays required will be obtained locally.

Preparation of Materials

The raw materials are unloaded and distributed direct from cars into six storage bins, each of 200 tons capacity. Smaller bins are provided for storage of the plaster of paris used in the molds and for clays and oxides used in preparing the glazes. The arrangement and subdivision of the raw material bins permit the separate storage of each shipment of material until the properties of the material have been checked and the shipment approved for use.

Charging scales of 1600 lb. capacity, carried on overhead monorail tracks, are used to weigh and convey the materials from the storage bins to the ball mills and blungers. The water used in the grinding and mixing of the materials is accurately measured through a flow meter and proportioned with proper allowance for the moisture content of the clays. Although the flint and feldspar are received ground so fine that for the most part they will pass through a 200 mesh lawn sieve, they are again ground wet in a ball mill before they are mixed with

TO SERVE better the Western utilities engaged in the rapid electrical development of the Mountain and Pacific Coast States, the Westinghouse Electric & Manufacturing Company has recently completed the only high voltage insulator factory in this territory. This is the first Westinghouse manufacturing unit in the West and an important addition to the industrial growth of the San Francisco bay district.

the clays. The china clay and ball clay properly proportioned are mixed in the blungers until all lumps are disintegrated and the fine particles suspended in the water. After the non-plastic materials are ground to the proper fineness they are forced from the ball mill into the blunger by compressed air and there mixed with the clays which have been previously suspended in water.

The blunged body or slip flows by gravity into storage cisterns, thence through vibrating lawns, and then through a magnetic separator to large storage tanks. While in storage the slip is continually agitated to maintain a homogeneous mixture and a uniform slip specific gravity.

The refined slip is then pumped to leaf type filter presses on the floor level where by carefully controlled pressure the water is forced out through filter cloth and the slip reduced to a plastic body with approximately twenty-three per cent water content. After the filter cakes have been removed from the press the body is given a preliminary pugging and stored in large closed concrete cellars.

After removal from the storage cellars the body is again mixed in the pug mills and, through dies of proper dimensions and shapes, extruded in columns from which blanks of clay are obtained of the weight required for the type of insulator to be made.

Molding the Raw Clay

All of the pin type and suspension insulators are formed by the most modern presses in use for insulator manufacture. Blanks of the plastic clay are formed and placed in plaster of paris molds, shaped to conform closely to the top surfaces of the insulator unit. A hot revolving tool is then brought down on the clay in the mold, forcing the clay to flow under pressure and accurately shaping the under surface of the insulator. After the excess clay has been cleaned from the face of the mold and any necessary fettling operations completed the molds containing the pressed insulator parts are placed in a steam heated release dryer until the pressed ware can be removed from the mold and handled without distorting its shape. The drying of the plastic body,



HIGH voltage insulators for Western transmission systems are made in the western works of the Westinghouse High Voltage Insulator Company. An exterior view of the plant is reproduced above (1). Progressive shop views shown are: (2) body preparation department, where materials are reduced to a plastic body; (3) large hot press where insulator parts are formed; (4) tie wire grooves are cut and insulator top surfaces are trimmed here; (5) coating insulators with glaze strip after coming from final dryer; (6) mechanical load tests in excess of the normal service load are applied before the insulators are subjected to the final electrical tests.

accelerated by the absorption of moisture by the plaster of paris molds, results in sufficient shrinkage to permit easy removal from the molds.

After the pressed ware has been removed from the molds and further properly dried the surface which had been in contact with the mold is trimmed off and the tie wire grooves are cut in the pin type insulators.

The ware, which is now of the shape of the porcelain part required for firing, is conveyed through a tunnel dryer 90 ft. long. This drying is carried on by circulating air under very accurately controlled temperature and humidity conditions, the temperature being gradually increased and the humidity decreased as the drying progresses.

The dried insulator parts are then covered with the glazing slip, which has been previously prepared to give the desired color glaze, and which fuses into a glass at the firing temperature of the porcelain body, resulting in a surface that cleans readily. Those surfaces on which a cementing bond is required for the assembly with other porcelain or metal parts are covered with particles of ground body, which during firing are bonded to the porcelain by the fused glaze.

The Firing Process

The insulators are then placed in refractory containers or "saggers" which are stacked in the kiln, one on top of another in ring formation to a height of twelve feet. The kilns, each fifteen and one-half feet inside diameter, are fired with oil or gas.

The control of the firing cycle and final temperature is one of the most important operations in insulator manufacture. The temperature control during the early stages of firing is indicated by the use of electrical recording pyrometers. Pyrometric cone plaques of four cones each placed in all parts of the kiln indicate the temperature during the final stages of firing and assist in obtaining the desired firing cycles. Commercial standard pyrometric cones are made from ceramic materials accurately proportioned to give a series of temperature indications 36 deg. F. (20 deg. C.) apart when subjected to temperatures increasing at the rate commonly used.

The temperature of the kiln is gradually increased to the maximum desired during a firing period of from 55 to 70 hours. After firing the kiln is cooled slowly to prevent internal strains which might result in the cracking of the porcelain.

After the inspection of the insulators drawn from the kiln they are subjected to a rigorous 60-cycle flashover test to eliminate parts having mechanical imperfections. The voltage of the 300-kva., 250,000-volt testing transformer used for the 60-cycle flashover and puncture tests is controlled from a panel, from which the operator has an unobstructed view of all tests and high voltage equipment. The uniform regulation of voltages up to 250,000 is accomplished through a 69-kva., 220-volt induction regulator with 100 per cent regulation. The test voltages are indicated at the control panel both by a crest voltmeter operated from the condenser bushing of the transformer and from a ratio voltmeter operated from a special voltmeter winding in the transformer.

The tested parts of multipart pin type insulators are then assembled and suspension insulator parts are assembled with hardware, mechanically mixed neat Portland cement being used. Resilient compounds are used to cushion mechanical stress which might be established as the result of unequal expansion or contraction when the component parts of units are subjected to sudden or extreme temperature changes. Care in the assembly and the accurate control of conditions during the setting of the cement are vital factors in determining the resistance of insulators to the severe temperature change stresses to which they are subjected in service.

Testing and Inspection

After proper setting of cement the units are cleaned, and the suspension insulators assembled in strings of six units each are tested in the pneumatically operated and controlled testing machine shown



Electrical recording pyrometer charts showing actual records of kiln temperatures. Pyrometric cone plaques before and after firing are also shown. The deformation at the end of the firing cycle of one of the cone plaques removed from kiln No. 4 is shown above the corresponding chart.

in the accompanying views. A mechanical load approximately 40 per cent of the ultimate strength of the insulators is applied before the units are subjected to the high frequency flashover test voltage obtained from the 200,000-cycle, 250,000-volt high frequency testing transformer.

The assembled insulators are then tested under a 60-cycle flashover voltage, and after final inspection crated for shipment.

The completeness and capacity of the test equipment installed affords means of conducting the most searching routine and design tests on the insulators manufactured. Sphere spark-gaps of 25 cm. and 37.5 cm. diameter are available for the accurate calibration of meters and for investigation work.

A 50,000-lb. testing machine is used for combined mechanical and electrical design tests and for ultimate mechanical strength tests on samples from standard production. Porosity tests under pressures of 5,000 lb. per sq. in. or more are made in a high pressure container used in the testing machine.

Manufacturing equipment is provided for a large production, and additional kilns may be added as soon as a greater output is required.

The Responsibility of the Jobber for the Contractor-Dealer

By E. A. Kincaid

Associate Professor of Commerce, McIntyre School of Commerce, University of Virginia

THE relationship of the jobber to the contractor-dealer has been the subject of much discussion among those engaged in the distribution of electrical goods. Various trade journals have also considered the subject from various angles. Charges have been made in these discussions and articles and the purport of some of these is that the jobber is largely responsible for the present status of the contractor-dealer situation. Let us now consider this subject for a short time. First, it has been said that the jobber has unwisely extended credit to individuals who call themselves contractor-dealers. By this it is meant that the jobber has sold goods at jobber's list without due consideration of the amount of credit extended in connection with these sales and without regard to persons to whom it has been extended.

This charge appears to have a good deal of currency among contractor-dealers, and it is also shared by some manufacturers' agents and others. By these it is alleged that almost anyone can obtain credit from the jobber and thus set himself up as a contractor-dealer. Naturally, it is inferred that the jobber is therefore responsible for the low standard of personnel that is found in many places in Pacific Coast territory where contractor-dealers flourish. It also follows that these individuals would seek to raise the standards of the retail outlets for goods by inviting the jobber to refuse to sell to the incompetent and the unfit.

Assuming, now, that it is true that the jobber extends credit and sells indiscriminately, what is the result of this practice? The contractor-dealer so favored will open up a small shop in some neighborhood or business section and stock with some appliances and fixtures. If he selects his location with care and is not permitted to overbuy, he may succeed. If he does succeed, a new outlet for appliances and other goods is secured and that is just what the jobber hoped to accomplish. By the very nature of his business the jobber is compelled to take such steps and assume the risk that the party favored with credit will fail. Not a few of them do fail and the jobber takes a loss. These losses are the cost of his efforts to secure new retail outlets that are exclusively electrical and thus a natural appendage of the jobber business.

THE blame for the troubles of electrical distribution has been placed by many at the door of the jobber. Mr. Kincaid in this issue discusses the responsibility of the jobber for the success of the electrical dealer and offers some suggestions as to the way out.

If the jobber refuses to extend credit he is thereby taking the attitude that nothing will be gained by experimentation and risk. When he extends credit to some contractors who thus become dealers he is deliberately experimenting and taking a chance that the contractor will make good as a dealer. By assuming the credit risk in ten cases the jobber may be able to set up one additional successful retail outlet as the net result. If the jobber does not actually look at the matter in this way it seems to me that he might logically do so. To what better use could he put the credit that is within his control? In what other way is the number of exclusively retail outlets to be expanded? Is it not essential that the jobber shall develop these exclusively electrical outlets if thereby the industry can function more effectively? If the jobber adheres to the belief that contractor-dealer outlets are the most profitable for him in the long run, it seems that this must be given some weight. The jobber is in business for profits. Society wants him to make profits and the fact that he does so is the best evidence that he is performing a valuable economic service.

Second, it is by no means conclusive that the jobber does extend credit unwisely or that he sells indiscriminately. The man at the head of the jobber's credit department makes investigation of the application for credit and decides what can be done with it. There is every reason to assume that care is used in extending credit. The jobber is not looking for chances to sink money into the contracting-dealing business and he makes every effort to aid only those dealers who give promise of proper use of the credit extended. Here, as in every other business, the jobber's credit department will often make mistakes even after every precaution has been taken. The mistakes are the cases that attract comment and criticism. The instances where credit was extended constructively are not brought up.

In the third place, it must be pointed out that the jobber is under pressure to aid contractor-dealers to continue in business wherever he can. To make this clear, let it be assumed that the jobber refuses to sell to certain contractors who desire to become dealers as well. The applicant for goods on credit may go elsewhere and obtain what he seeks. It is

not unlikely that he will turn to some so-called "pirate" jobber and thus the regular jobber finds that his action has resulted in encouraging competition from a source which he would like to stifle. How is the regular jobber to preserve the market for electrical goods from destruction if he does not fight for merchandising standards? This is not an argument that only high-priced electrical goods should be sold. It is rather an argument that the public has a right to buy what it pleases, but it should be informed that there are standards of electrical merchandise that should be considered when choice is made. If the regular jobber handles only high grade merchandise he surely has the right to do what he can by fair competitive methods to drive out inferior goods and he will be the first to admit the same right to the so-called "pirate" jobber. The question as to whether or not it is fair for "pirate" jobbers and dealers to survive because the public does not know the difference between standard and other goods still remains to be faced, but that question cannot be disposed of now.

Finally, it is necessary to draw attention to the fact that when the jobber refuses to do what is within his power to open up new contractor-dealer outlets he runs the risk that consumers will be led to department stores in order to obtain electrical appliances. In other words, his action may build up business for these retail outlets. If he deliberately permits this to occur he must take the consequences, for he knows that the contractor-dealer will buy from the electrical jobber and he does not know that the department store will. If he cares to investigate, he can ascertain the fact that many department stores buy directly from the manufacturer. If the department store does this, then it is working to the elimination of the jobber insofar as such a course will accomplish that end. In previous articles it has been pointed out that jobber distribution is indispensable to the interests of small manufacturers scattered over a country of this size. But when the jobber loses the business that comes from large manufacturers, the costs of maintaining jobber distribution for small manufacturers will tend to rise and neither the manufacturer, the jobber nor the consumer is benefited.

What the Jobber Can Do

From what has been said it follows that the jobber's contribution to the solution of the contractor-dealer problem must come in some other way than through the extension of credits. One way in which it may come effectively has been demonstrated at Seattle where all factors in the electrical distributing business are cooperating for the good of each other, in the Seattle Electric Club. The jobbers have played and are now playing an important part in making that club a success, with the hope that a fraternal spirit will be developed between contractor-dealers and all other factors engaged in distributing electrical goods. It is particularly important that contractor-dealers be included in such organizations, for in that way they can take the measure of the men engaged in other phases of the electrical busi-

ness, they can gain a point of view that is professional, they can come to have a spirit of unity that will make for the integrity of the trade as a whole. In such clubs it is possible for one man to see the other's point of view and thus to understand and share his burdens to some extent. Not the least of the benefits of such an organization is the fact that it makes possible a certain amount of educational work, the result of which should bring home to the contractor-dealer the necessity of adhering to sound merchandising standards. Moreover, there is also the opportunity that the contractor-dealer can be made to see the interdependence of the parts of the electrical marketing mechanism. Perhaps he can be made to appreciate the fact that a chain is no stronger than its weakest link and that when one part of the mechanism breaks down the whole machine suffers. Men make money in these days by helping other people to make money. No interest, no matter in what economic field, can live within itself. It is always a case of deciding whether the related interests shall hang together or hang separately. There is a great need in Pacific Coast territory for more of that broad and friendly spirit which animates the Seattle Electric Club. A narrow and selfish point of view will not solve the problem now uppermost in the electrical distributing field. I can find no better way to express the situation than to say that men of vision must take the lead and these men must be commercial statesmen.

The Contractor-Dealer's Point of View

The contractor-dealer cannot be abandoned without some consideration of the problems of that factor in the distribution of electrical goods from the contractor-dealer's own point of view. But the question naturally arises as to what sort of contractor-dealer shall speak for his own kind, taken as a whole. As to this there appears to be but one reasonable answer, to-wit, the status of contractor-dealers as a class must be viewed from the angle of one of their number who is doing business along sound lines and at the same time seeking to understand and solve the problems of the group. In other words, what do the best and most thoughtful contractor-dealers think of themselves and their fellows who engage in retail distribution of electrical goods while contracting?

When the subject is approached from this angle it appears that we have to consider several distinct classes of individuals. (a) There is the casual or "curbstone" contractor who has a shop in a garage or the basement of his own house. His equipment consists of a Ford and a few tools, some experience as a workman with other contractors and a license from the city where he operates. These casuals manage to get small jobs such as wiring cottages by cutting in on the estimate of the legitimate contractor. They regard the profits in contracting as high chiefly because they do not keep any accurate record of their own expenses. They buy wiring materials from jobbers and sell them to the home-owner at a profit, so they think. The casual may not have technical knowledge sufficient to enable him to install

heavy appliances such as ranges and water heaters and if that be the case he will dissuade the home-owner from including proper connection and wiring for these. They have been known to inquire of competent contractors as to how to install such appliances. If necessary to get a contract, the casual will not hesitate to induce the home-owner to reduce the number of outlets. This is his greatest offence against the legitimate contractor, the jobber and the power company. It is because of this practice that casuals are to be regarded as parasites on the industry and poor advisers of the home-builders. The proportion of casuals to all contractors runs quite high. In some Coast cities it is as high as sixty per cent.

The Legitimate Contractor

From the ranks of the casuals, as well as from other sources, (b) the regular and legitimate contractor is recruited. He is generally one of the more intelligent and better educated casuals who has managed to push into a field of larger usefulness. With his experience as a casual or as a workman with a large contractor he steps out and goes it alone. His tendency is to specialize in contracting for the wiring of large buildings such as hotels, office buildings, apartment houses and the like. Such a contractor may or may not engage in dealing on the side. He may have an electrical shop, but often he has nothing at all to do with the merchandising of appliances. Such a contractor makes his contracts by means of announcements of building permits, through building contractors, architects and engineers. He, therefore, does business on a large scale and seldom touches residential work unless it be for some syndicate that is putting up a large number of houses in a new addition, or something of the sort.

Enter the Contractor-Dealer

From the ranks of the casual contractor there is also graduated (c) the contractor-dealer. It would not be far from the truth to say that ninety per cent of all casuals aspire to become contractor-dealers. It is with these that the regular contractor-dealer has to deal. The casual contractor is more than likely to become a "pirate" contractor-dealer. He may not continue to work with such standards indefinitely, but he must get his start and it is to be regretted that so many of them consider "pirating" the best way to get started. The "pirate" buys from jobbers who carry low grade and, therefore, cheap merchandise. By so buying he is in a position to cut under the contractor-dealer who handles standard goods and sells at list without price-cutting. Some of these off-grade contractor-dealers have places of business, while others do all their merchandising directly from the jobber to the consumer without carrying stock. Since they do not do business in the regular or customary fashion their costs are thought to be less and for this reason their competition becomes deadly to the regular contractor-dealer. Thus the standards of the business both as to prices and quality of goods are torn to shreds and a contractor-dealer who aspires to do business on a leading business street in a neat

and attractive shop stocked with high grade goods, finds himself confronted with a problem that is hard, if not impossible, to meet.

In consequence of these things the legitimate contractor-dealer will not be slow to admit (1) that there are too many contractor-dealers, (2) that the contracting-dealing business is not a paying one, (3) that it is necessary to discredit the "pirate" contractor-dealer with his prospective customer before the regular contractor-dealer can obtain a chance at the business. Finally (4) he will admit that, but for the profit that comes from the sale and installation of supplies, the merchandising end of the business could not be carried and (5) that the casual contractor is doing his level best to take all the profit out of this part of the contracting-dealing business.

The Jobber as Defendant

The story of the regular contractor-dealer who tries to do business as it should be done, on a legitimate cost-plus-profit basis, does not end with his account of his struggle to overcome the problems arising from within the ranks of the contracting-dealing business. He has certain counts against the jobber. In the first place he holds that the jobbers do, as a rule, sell to any contractor who holds a license. To this he objects, for he feels that he has a right to regard the jobber as a natural ally to whom he might look for cooperation. It is his notion that the jobber who thus sells is really striking at the very foundations on which his business rests. Then, he asserts that the jobber extends credit to these contractors and thus enables them to operate where operation would otherwise be impossible. He deplores the fact that jobbers are divided into two camps, association and non-association jobbers, because, divided in this fashion, there is necessarily less cooperation with the contractor-dealer who seeks to stabilize and perpetuate the logical outlet for appliances. He is inclined to hold that there is too much competition among jobbers and attributes this to the fact that there are too many jobbers, or else to the division of jobbers into two camps. At any rate, he is certain that he suffers because of this excessive competition and the resulting indiscriminate establishment of contractor-dealers without standards, without ethics and without concern for the future of the contracting-dealing business.

The Dealer's Remedy

For these problems the contractor-dealer of the better sort has certain remedies which he would like to have tried out. The first of these would cause the jobber to refuse to sell to the casual contractor and thus make it impossible for him to become a sort of dealer as well. To put the thing concretely, he would have the jobber refuse to sell to anyone who did not have a place of business and a minimum stock, say \$1,000 in value. In the next place it is suggested that the state and city shall require all contractors to take an examination which must be passed before a license may be obtained. Not only that, but the fee for the license should be considerably increased over that ordinarily required and the licensee should

be required to give bond of such amount that any but the more competent will be deterred from entering the field. Finally, he would have an arrangement with organized labor whereby it is established that such labor will not work for a contractor who works with tools at his own job.

Recruiting from the Right Source

Now, it is not possible to enter into any extended discussion of the merits of the position taken by the type of contractor-dealer here under consideration. I have included this account because it is essential that all readers shall grasp the actual situation in Pacific Coast territory as it is seen by the several factors in distribution. It need not be said that there is much truth in what the legitimate contractor-dealer alleges. The outstanding thing to be said about it all is that the contractor-dealer outlet for electrical appliances is imperilled because the individuals who man these outlets are recruited from the wrong source. Ninety per cent of them are mechanics by inclination and experience. They do not make

merchants and hence they do not provide efficient outlets for merchandise. If this outlet is to survive and serve the electrical distributing business it must draw men from a different source. The method of recruiting is wrong.

To emphasize this let me refer to an instance brought to my attention in Oregon. There a certain jobber spoke of a young contractor-dealer who had opened and was then conducting a prosperous contracting-dealing establishment in a certain city. But this young man had a foundation on which to build. He had been for a few years in a wholesale electrical house and he had then taken the road for the same house. In the course of his travels he learned of a business that could be made profitable, if operated along right lines. He resigned, bought the business and put his equipment behind it and made it go.

It can be done and when it is done it will have to be done along these lines. The future of the contractor-dealer outlet for electrical appliances is a question of the brains that will be drawn into the business.

The Proposed Text of the Erickson Bill

EDITOR'S NOTE—Read the following bill which will be presented to the voters of Washington this fall and then the analysis of its various clauses by the editors on page 246. Then make up your mind for yourself as to the importance of joining the fight against this measure.

AN ACT relating to and authorizing the establishment of public utility districts; providing for the construction, purchase, condemnation and purchase, acquisition, maintenance, conducting, operation, development and regulation by such districts of certain kinds of public utilities; providing methods of payment therefor; and providing for the creation of local assessment districts by, and defining, prescribing and regulating the powers, duties and government of, such utility districts.

BE IT ENACTED BY THE PEOPLE OF THE STATE OF WASHINGTON:

Section 1. The purpose of this act is to authorize the establishment of public utility districts to conserve the water and power resources of the State of Washington for the benefit of the people thereof, and to supply at the lowest possible cost public utility service, including water for domestic, irrigation and power purposes, electricity for domestic, public, private and commercial lighting, heating, power and other purposes.

Section 2. Municipal corporations, to be known as Public Utility Districts, are hereby authorized for the purposes of, and may be established within the limits of the State of Washington as provided in this act.

Section 3. A group of qualified electors of any one or more counties of the State of Washington desiring to organize a public utility district shall present a petition for an election to the Secretary of State. Such petition shall be signed by no less than five hundred (500) qualified electors in all Class A counties, two hundred fifty (250) in all first and second class counties, and one hundred (100) in all other counties, situate within the district described in said petition, such petition to be filed with the Secretary of State at least thirty (30) days before the election at which the question is to be submitted, the time of holding which shall be specified in the petition. Such petition shall be printed on bond paper eight (8) inches wide and fourteen (14) inches long, ruled for twenty-five (25) signatures, with space for initials of registration officer, name, address and city or precinct, with the same certificate of registration officer at bottom of sheet as is or may be prescribed by State law for initiative petitions to the Legislature. It shall be the duty of the registration officers in cities or precincts where petitions are circulated to check and certify the same as initiative petitions are checked, without charge to circulators, and such check shall be sufficient evidence of validity for the Secretary of State. No person having signed such petition shall be allowed

to withdraw his name therefrom after the filing of the same with the Secretary of State. The Secretary of State shall thereupon call a special election within the area embraced by, and at the same time specified in, the petition, and shall notify the local officers charged with the conducting of elections to proceed with their duties in respect thereto, and in the manner he certifies to the county auditors of the various counties the names of candidates for state and district officers, shall certify to each county auditor within the district the ballot title of the petition to be voted on at said election and the names of the candidates for president and commissioners of said proposed district. In submitting the question of the creation of the public utility district to the voters for their approval or rejection, the proposition shall be expressed on said ballot substantially in the following terms:

Public Utility District No.....YES
Public Utility District No.....NO

giving in each instance the number of the district as may be decided on by the Secretary of State. Except as herein otherwise provided, the manner of submission to the voters, the giving of notice, the holding and conduct of the election, the counting and canvassing of votes and returns thereof shall be governed by the general laws applicable to elections in respect to initiative hills. It shall be the duty of the Secretary of State, in the presence of the Governor, within twenty (20) days after such election, to canvass the votes and certify to the Governor the result thereof, and the Governor shall forthwith issue his proclamation as to the result of the election. If at the election for the creation of a public utility district a majority of the votes cast upon this proposition within said proposed district be in favor of the creation of said public utility district, said public utility district shall thereby be created and shall then be and become a municipal corporation of the State of Washington, with the powers prescribed by this act.

Section 4. The powers of the public utility district shall be exercised through a non-partisan

commission, consisting of a president and four (4) commissioners, hereinafter referred to as the "Commission." No person shall be eligible to hold the office of president or commissioner of a public utility district unless he is a qualified elector of a county within the district, a freeholder therein, and has been a resident therein for a period of two (2) years, or who is employed by, or holds any official relation in respect to, or is interested in, any public service company, or who owns, or is interested in, the bonds, stocks, mortgages, securities, contracts or earnings thereof, or who is engaged in any occupation or business inconsistent with his duties as such president or commissioner. Whenever the creation of a public utility district is submitted to the voters as herein provided, there shall at the same time be elected a president for six (6) years and four (4) commissioners, two (2) for four (4) years and two (2) for two (2) years, the two (2) commissioners receiving the highest votes to serve for a period of four (4) years, and the two (2) receiving the next highest votes to serve for a period of two (2) years, and thereafter the president and commissioners shall hold office for six (6) years unless sooner recalled. Each of said terms shall date from twelve o'clock noon of the fourth Monday following the election. Candidates for president and commissioners shall file for election on blanks furnished by the Secretary of State and shall sign the same and pay a filing fee of thirty dollars (\$30.00) at least thirty (30) and not more than sixty (60) days prior to the election. The names of candidates shall by the Secretary of State be certified to the respective local officers charged with the calling and conducting of elections and such names shall be printed on the ballot in alphabetical order, without party designation, names for president listed first. In the event of a vacancy in the commission or presidency, occasioned by recall or otherwise, such vacancy shall be filled by appointment by a majority vote of the commission, and the person thus elected shall hold office until the next election, at which time a successor shall be elected either to fill the unexpired portion of the term or a new term, as the case may be. Should such ad interim appointment not be made

by the commission within fifteen (15) days following the occurrence of the vacancy, the appointment shall be made by the Chief Justice of the Supreme Court of the State of Washington. A general election shall be held in each public utility district biennially, and a special election may be called by resolution of the commission. Until otherwise provided by law, all general elections held pursuant to this act shall be held on the second Tuesday of March, as provided in Section 5144, Remington's Compiled Statutes, as amended, for the holding of elections in certain political subdivisions of the state in Class A counties and counties of the first class, and, except as otherwise provided in this act, shall be conducted in the manner provided by the general election laws governing the election of state and county officers. The president, who shall devote his entire time to the work of the commission, shall be paid a salary of Five Hundred Dollars (\$500.00) per month, and the commissioners shall each be paid a salary of Two Hundred Fifty Dollars (\$250.00) per month, and shall also be paid for actual traveling expenses and disbursements while away from home on the business of the public utility district, their claims to be audited by the State Auditor: Provided, that in public utility districts with less than one hundred and fifty thousand registered voters, the president shall be paid a salary of Two Hundred Fifty Dollars (\$250.00) per month, and the commissioners One Hundred Twenty-five Dollars (\$125.00) per month. In the event a public utility district be formed in which part of the district is east of the summit of the Cascade Mountains and part is west, two (2) of the commissioners shall be residents of the east side and two (2) shall be residents of the west side, elected at large. The candidates shall file as candidates for commissioners for the side in which they reside and when two (2) commissioners are to be elected, one candidate shall be from each side and the one on each side receiving the highest vote in the entire district shall be elected. Before taking office, the president and commissioners shall take oath of office as required for the Governor and other state officers. The president shall be the presiding officer and shall call a meeting of the commission on the day the term of office begins to elect a member of the commission as secretary and organize to carry on the work of the commission, with headquarters at the county seat of the most populous county in the district. The commission shall by resolution adopt rules governing the transaction of its business and shall adopt an official seal, and no appropriation shall be made except by resolution.

Section 5. The public utility district shall have power:—

(a) To make a survey of the hydro-electric power, irrigation and domestic water supply resources of the district, and to compile comprehensive maps and plans showing the territory that can be most economically served by the various resources and utilities, the natural order in which they should be developed, and how they may be joined and co-ordinated to make a complete and systematic whole, and the commission shall, within the district, assume all the powers and duties of the Director of Conservation and Development which were formerly exercised by the State Hydraulic Engineer.

(b) To construct, condemn and purchase, purchase, acquire, lease, add to, maintain, operate, develop and regulate all lands, property, property rights, water, water rights, dams, ditches, flumes, aqueducts, pipes and pipe lines, water power, leases, easements, rights of way, franchises, plants, plant facilities and systems for generating electric energy by water power, steam or other methods, plant, plant facilities and systems for developing, conserving and distributing water for domestic use and irrigation, buildings, structures, poles and pole lines, and cables and conduits and any and all other facilities, and to exercise the right of eminent domain to effectuate the foregoing purposes or for the acquisition and damaging of the same or property of any kind appurtenant thereto, and for the purpose of acquiring the right to make physical connection with plants and plant facilities of any and all persons, corporations and municipalities, and such right of eminent domain shall be exercised and instituted pursuant to resolution of the commission and conducted in the same manner and by the same procedure as is or may be provided by law for the exercise of the power of eminent domain by the State of Washington, except in so far as such law may be inconsistent with the provisions of this act, and except that the public utility district's attorneys or attorney shall do, and they are hereby empowered to do, any and all acts which the Attorney General does or may do in the procedure provided by law for the State of Washington. It shall be no defense to a condemnation proceeding hereunder that the property sought to be taken or damaged is already devoted to a public use: Provided, that no public utility owned by a city or town shall be condemned hereunder. In any condemnation proceedings under this act, just compensation shall be made for property

taken: Provided, that the commission, judge and jury may consider tract assembling values and severance damages, and shall consider the values placed upon such property for taxation, and in respect to property, plants and facilities of persons and corporations using public highways for the furnishing of public service without franchises, shall consider in determining the value thereof the fact that such property, plants and facilities are subject to be removed from such highways by reason of being so operated without such franchises.

(c) To construct, purchase, condemn and purchase, acquire, add to, maintain, conduct and operate water works and irrigation plants and systems, within or without its limits, for the purpose of furnishing such public utility district, and the inhabitants thereof, and any other persons, including public and private corporations within or without its limits, with an ample supply of water for all uses and purposes, public and private, including water power, domestic use and irrigation, with full and exclusive authority to sell and regulate and control the use, distribution and price thereof.

(d) To purchase, within or without its limits, electric current for sale and distribution, and to construct, condemn and purchase, purchase, acquire, add to, maintain, conduct and operate works, plants, transmission and distribution lines and facilities for generating electric current, operated either by water power, steam or other methods, within or without its limits, for the purpose of furnishing said public utility district, and the inhabitants thereof, and any other persons, including public and private corporations, within or without its limits, with electric current for domestic, public, private and commercial heating, lighting, power and other purposes, with full and exclusive authority to sell and regulate and control the use, distribution and price thereof, together with the right to purchase, handle, sell or lease meters, lamps, motors, transformers and any and all other kinds of equipment and accessories of every nature and kind whatsoever necessary and convenient for the use, distribution and sale thereof: Provided, that the commission shall not supply water to a privately owned utility for the production of electric energy, and shall not supply, directly or indirectly, to privately owned public utilities which sell electric energy or water to the public more than twenty (20) per cent of the total amount of electric energy or water under its control and contracts therefor shall not extend over a longer period than five (5) years, or be renewed before one (1) year prior to their expiration.

(e) And for the purposes aforesaid, it shall be lawful for any public utility district so organized to take, condemn and purchase, purchase, acquire any and all public and private property, franchises and property rights, including state, county and school lands and property and littoral and water rights, for any of the purposes aforesaid, and for railroads, tunnels, pipe lines, aqueducts, transmission lines, telephone systems and lines, and any and all other facilities necessary or convenient; and, in connection with the construction maintenance or operation, of any such utility or utilities, to acquire by purchase or condemnation and purchase the right to divert, take, retain and impound and use water from or in any lake or watercourse, regardless of whether such lake or watercourse or the water therein be public or private, navigable or non-navigable, or held, owned or used by the State, or any subdivision thereof, or by any person or corporation for any public or private use, proprietary or governmental, or any underflowing water within the State; and such public utility district is hereby authorized and empowered to erect and build, within or without its limits, dams or other works across any river or watercourse, or across or at the outlet of any lake, up to and above high water mark; and, for the purpose of constructing or laying aqueducts or pipe lines, dams or waterworks or other necessary structures in storing, retaining and distributing water as above provided, or for any of the purposes provided for by this act, such public utility district shall have the right to occupy and use the beds and shores up to the high water mark of any such lake, river or watercourse, and to acquire by purchase or by condemnation and purchase, or otherwise, any water, water rights, easements or privileges named in this act or necessary for any of said purposes, and any such public utility district shall have the right to acquire by purchase or condemnation and purchase, or otherwise, any lands, property or privileges necessary to be had to protect the water supply of such public utility district from pollution: Provided, that should private property be necessary for any such purposes, or for storing water above high water mark, such public utility district may condemn and purchase or purchase and acquire such private property. Such public utility district shall have power to build and maintain inter-tie lines connecting its power plant and distribution system with the power plant and distribution system owned

by any other public utility district, or municipal corporation, or to connect the power plants and distribution systems owned by any municipal corporation in the district, and from any such inter-tie line to sell electric energy to any city, individual, local utility district, or corporation, public or private, and, by means of aqueducts or pipe lines, to conduct the water for all purposes, and, by means of transmission or pole lines, to conduct electric energy throughout the State, and to construct and lay said aqueducts, pipe or pole lines, and transmission lines along and upon public highways, roads and streets, and to condemn and purchase, purchase or acquire, lands, franchises and rights of way necessary for the same.

(f) To contract indebtedness or borrow money for corporate purposes on the credit of the corporation or the gross receipts of the public utilities thereof, and to issue general or utility bonds therefor, bearing interest at a rate not exceeding six (6) per cent per annum, payable semi-annually; to purchase with surplus funds local utility district bonds of districts created by the commission and sell the same, giving preference to residents of the district, and to create a revolving fund to insure the prompt payment of all local utility district bonds.

(g) To raise revenue by the levying of an annual tax on all taxable property in such public utility district not exceeding two (2) mills in any one year, exclusive of interest and redemption for general bonds. The commission shall prepare a proposed budget of the contemplated financial transactions for the ensuing year and file the same among the records of the commission on or before the second Monday in September. Notice of the filing of said proposed budget and the date and place of hearing on the same shall be published in one issue of a newspaper printed and in general circulation in said district seven (7) days prior to the hearing upon said proposed budget. On the first Monday in October the commission shall have a public hearing on said proposed budget at which any taxpayer may appear and be heard against the whole or any part of the proposed budget. Said hearing may be continued from day to day until concluded, but not to exceed a total of five (5) days. Upon the conclusion of said hearing the commission shall by resolution adopt the budget as finally determined, and fix the final amount of estimated expenditures for the ensuing year. Taxes levied by the commission shall be certified to and collected by the proper county officer of the respective counties included within the district in the same manner and subject to the same restrictions and procedure as is or may be provided by law for the certification and collection of county taxes. The commission is authorized prior to the receipt of taxes raised by levy, to borrow money or issue warrants of the district in anticipation of the revenue to be derived by such district from the levy taxes for the purposes of such district, and such warrants shall be redeemed from the first money available from such taxes when collected, and such warrants shall not exceed the anticipated revenues of one (1) year, and shall bear interest at a rate of not to exceed seven (7) per cent per annum.

(h) To enter into any contract with the United States Government, or any state, or other utility district, or any department of these governing bodies, which will benefit the public utility district of these governing bodies in carrying out any of the powers authorized by this act.

(i) To acquire by gift, devise, bequest, lease or purchase, real and personal property necessary or convenient for the purposes of the district or any local district therein.

(j) To make contracts, employ engineers, attorneys and other technical or professional assistance, and to hire clerks, laborers and other employees; to print and publish information or literature, and to do all other things necessary to carry out the provisions of this act.

(k) To sue and be sued in any court of competent jurisdiction: Provided, that all suits against the public utility district shall be brought in the county in which the commission maintains its headquarters: Provided, further, that no suit for damages shall be maintained against such public utility district except on the basis of a claim therefor filed with the commission of such district complying in all respects with the terms and requirements for claims for damages filed pursuant to general law against cities of the second class.

(l) By resolution to establish and define the boundaries of local assessment districts to be known as Local Utility District No. _____ for the distribution under the general supervision and control of the commission, of water for domestic use and (or) irrigation, electric energy, in like manner to provide for the purchasing or otherwise acquiring, or constructing and equipping distribution systems for said purposes and extension thereof, and to levy and collect in accordance with the special benefits conferred

thereon special assessments and re-assessments on property specially benefited thereby, for paying the cost and expense of the same, or any portion thereof, as herein provided and to issue local improvement bonds and (or) warrants to be repaid wholly or in part by collection of local improvement assessments.

The commission shall by resolution establish the method of procedure in all matters relating to local utility districts. Except as herein otherwise provided, all matters and proceedings relating to the local utility district, the levying and collection of assessments, the issuance and redemption of local improvement warrants and bonds and the enforcement of local assessment liens hereunder, shall be governed, as near as may be, by the laws relating to local improvements for cities and towns: Provided, that no protest against a local utility district improvement shall be received after twelve o'clock noon of the day set for hearing. All local utility district assessments becoming a lien upon any property in any public utility district shall be collected by the County Treasurer of the county in which such property is situated. As soon as the commission shall approve the assessment roll, it shall deliver a copy of the same to the County Treasurer in which the particular property is situated and, in case the property is situated in more than one county, it shall segregate the property of the said assessment roll, and deliver to each County Treasurer the part which contains the property within their respective counties. From and after such delivery the assessments therein provided shall be and constitute liens upon the properties against which the same were respectively assessed. In all other respects, the duties and powers imposed and conferred by the local improvement laws upon municipal and county officers shall be performed by the president of the commission, in so far as the same shall relate to the enforcement of such local improvement laws in respect to local utility districts created hereunder.

Section 6. Whenever the commission shall deem it advisable that the public utility district purchase, purchase and condemn, acquire, or construct any such public utility, or make any additions or betterments thereto, or extensions thereof, the commission shall provide therefor by resolution, which shall specify and adopt the system or plan proposed, and declare the estimated cost thereof, as near as may be, and specify whether general or utility indebtedness is to be incurred, the amount of such indebtedness, the amount of interest, and the time in which all general bonds (if any) shall be paid, not to exceed thirty (30) years. In the event the proposed general indebtedness to be incurred will bring the indebtedness of the public utility district to an amount exceeding one and one-half per cent ($1\frac{1}{2}\%$) of the taxable property of the public utility district, the proposition of incurring such indebtedness and the proposed plan or system shall be submitted to the qualified electors of said public utility district for their assent at the next general or special election held in said public utility district.

Whenever the commission (or three-fifths of the qualified voters of such public utility district, when it is necessary to submit the same to said voters) shall have adopted a system or plan for any such public utility, as aforesaid, and shall have authorized indebtedness therefor, general or public utility bonds may be issued, as hereinafter provided. Said general bonds shall be serial in form and maturity and numbered from one upwards consecutively. The various annual maturities shall commence with the second year after the date of issue of such bonds. The resolution authorizing the issuance of the bonds shall fix the rate of interest the bonds shall bear, said interest not to exceed six (6) per cent, and the place and date of payment of both principal and interest. The bonds shall be signed by the president of the commission, attested by the secretary of the commission, and the seal of the public utility district shall be affixed to each bond but not to the coupon: Provided, however, that said coupon, in lieu of being so signed, may have printed thereon a fac simile of the signature of such officers. The principal and interest of such general bonds shall be paid from the revenue of such public utility district after deducting costs of maintenance, operation and expenses of the public utility district, and any deficit in the payment of principal and interest of said general bonds shall be paid by levying each year a tax upon the taxable property within said district sufficient to pay said interest and principal of said bonds, which tax shall be due and collectible as any other tax. Said bonds shall be sold in such manner as the commission shall deem for the best interest of the district. All bonds and warrants issued under the authority of this act shall be legal securities, which may be used by any bank or trust company for deposit with the State Treasurer, or any County or City Treasurer, as security for deposits, in lieu of a surety bond, under any law relating to deposits of public moneys. When the commission shall not

desire to incur a general indebtedness in the purchase, condemnation and purchase, acquisition, or construction of any such public utility, or addition or betterment thereto, or extension thereof, it shall have the power to create a special fund or funds for the sole purpose of defraying the cost of such public utility, or addition or betterment thereto, or extension thereof, into which special fund or funds it may obligate and bind the district to set aside and pay a fixed proportion of the gross revenues of such public utility, or any fixed amount out of, and not exceeding a fixed proportion of, such revenues, or a fixed amount without regard to any fixed proportion, and to issue and sell bonds or warrants bearing interest not exceeding six (6) per cent, per annum, payable semi-annually, executed in such manner, and payable at such times and places, as the commission shall determine, but such bonds or warrants, and the interest thereon, shall be payable only out of such special fund or funds. In creating any such special fund or funds, the commission shall have due regard to the cost of operation and maintenance of the plant or system as constructed or added to, and to any proportion or part of the revenues previously pledged as a fund for the payment of bonds or warrants, and shall not set aside into such special fund or funds a greater amount or proportion of the revenues and proceeds than, in its judgment, will be available over and above such cost of maintenance and operation and the amount or proportion, if any, of the revenues so previously pledged. Any such bonds or warrants, and interest thereon, issued against any such fund, as herein provided, shall be a valid claim of the holder thereof only as against the said special fund and its fixed proportion or amount of the revenue pledged to such fund, and shall not constitute an indebtedness of such district within the meaning of the constitutional provisions and limitations. Each such bond or warrant shall state on its face that it is payable from a special fund, naming such fund and the resolution creating it. Said bonds and warrants shall be sold in such manner as the commission shall deem for the best interests of the district, and the commission may provide in any contract for the construction and acquisition of a proposed improvement or utility that payment therefor shall be made only in such bonds or warrants at the par value thereof. In all other respects, the issuance of such utility bonds or warrants and payment therefor shall be governed by the public utility laws for cities and towns.

Section 7. All proceedings of the commission shall be recorded in a book or books kept for such purpose, which shall be public records. Three (3) members of the commission shall constitute a quorum, but no resolution shall be passed without a majority vote of the whole commission and regular meetings shall be held on the first Monday of each month. Special meetings may be called at any time by the president, or the president shall call a special meeting at any time upon written request of three (3) commissioners.

All materials purchased and work ordered, the estimated cost of which is in excess of Five Thousand Dollars (\$5,000.00), shall be by contract. Before awarding any such contract, the commission shall cause to be published in some newspaper within the public utility district a notice for at least ten (10) days before the letting of said contract, inviting sealed proposals for such work, plans and specifications for which must at the time of the publication of such notice be on file at the office of the public utility district, subject to public inspection: Provided, however, that the commission may at the same time, and as part of the same notice, invite tenders for said work or materials upon plans and specifications to be submitted by bidders. Such notice shall state generally the work to be done, and shall call for proposals for doing the same, to be sealed and filed with the commission on or before the day and hour named therein. Each bid shall be accompanied by a certified check, payable to the order of the commission, for a sum not less than five per cent (5%) of the amount of the bid, and no bid shall be considered unless accompanied by such check. At the time and place named, such bids shall be publicly opened and read, and the commission shall proceed to canvass the bids, and may let such contract to the lowest responsible bidder upon plans and specifications on file, or to the best bidder submitting his own plans and specifications: Provided, however, that no contract shall be let in excess of the estimated cost of said materials or work, or if, in the opinion of the commission, all bids are unsatisfactory, they may reject all of them and re-advertise and in such case all checks shall be returned to the bidders; but if such contract be let, then, and in such case, all checks shall be returned to the bidders, except that of the successful bidder, which shall be retained until a contract shall be entered into for the purchase of such materials or doing such work, and a bond to perform such work furnished, with sureties satisfactory to the commission, in the

full amount of the contract price, between the bidder and the commission, in accordance with the bid. If such bidder fails to enter into said contract in accordance with said bid and furnish such bond within ten (10) days from the date at which he is notified that he is the successful bidder, the said check and the amount thereof shall be forfeited to the public utility district.

Every contractor and sub-contractor performing any work for said public utility districts or local utility districts within said public utility district shall pay or cause to be paid to its employees on such work or under such contract or sub-contract not less than the minimum scale fixed by the resolution of the commission in the notice and call for bids on such work. The commission in fixing such minimum scale of wages shall fix the same as near as possible to the current prevailing and going wages within the district for work of like character.

Section 8. The County Treasurer of each county within the district shall maintain a fund to be known as the "Public Utility Fund," into which shall be paid all moneys received by him from the collection of taxes in behalf of such district. The State Treasurer shall maintain in respect to each district a fund to be known as the "Public Utility District No. Fund," into which shall be paid all moneys received by him from the collection of taxes in behalf of such public utility district by the county treasurers. The State and County Treasurers shall also maintain such other special funds as may be prescribed by the commission, into which shall be placed such moneys as the commission may by its resolution direct, and all moneys due the public utility district shall be paid to the State Treasurer, or such County Treasurer as he may direct. All disbursements, including salaries of president and commissioners, shall be made by the State Treasurer on warrants drawn by the State Auditor, who shall draw the same upon the order of, or voucher approved by, the commission. The commission shall keep an account for each unit or utility and fix rates with due regard to making it ultimately self-sustaining, and shall make annual reports to the Governor of the State of the affairs of the commission, giving comprehensive statement of receipts, expenditures, assets, liabilities, extensions and betterments.

Section 9. Any county or public utility district of a lesser population may be annexed to and become part of another public utility in the following manner:

Five per cent (5%) of the registered voters resident of the county or district proposed to be annexed may petition the commission of the public utility district to which they desire to be annexed to approve and cause the question of annexation to be submitted to the legal voters of the territory proposed to be annexed. Such petition shall define the limits of the territory proposed to be annexed to such public utility district. Upon the filing of such petition with the commission, such commission shall provide for a hearing to be held for the discussion of such proposed annexation at the office of said commission, and shall give due notice of such hearing by publication in a weekly newspaper published in said public utility district for at least two (2) weeks prior to the hearing. If said commission shall concur in the petition, the County Commissioners (or, in the case of a district, its commission) in the county or district which is seeking to be annexed shall, upon notice from the commission, submit the proposition of annexation to the voters of said county or district at the next general election. Upon the adoption of said proposition of annexation by a majority of the voters voting on said proposition, the County Commissioners (or the commission) shall certify the results of the election to the commission of the annexing district, and the same shall be entered upon the records of the commission thereof. Thereupon said county or district shall become annexed to, and become a part of, the greater public utility district. When a smaller public utility district is annexed or consolidated with a larger one, all utilities of the smaller public utility district shall be operated by the commission of the greater district: Provided, that no property of either of the former public utility districts so consolidated shall ever be subjected to a general tax to pay any portion of any indebtedness of either of the other of such former public utility districts contracted prior to, or existing at the date of, such consolidation.

Section 10. If any part of this act shall be adjudged to be invalid or unconstitutional, such adjudication of invalidity or unconstitutionality shall not affect the validity or constitutionality of the act as a whole, or of any part thereof not adjudged invalid or unconstitutional.

Section 11. This act shall not be deemed or construed to repeal existing acts relating to the construction, maintenance and operation of public utilities by municipal corporations, but shall be deemed to be supplemental thereof.

Shall the State Go into the Power Business in Washington?

UNLIKE the California proposed water and power act of 1922 the Washington measure is not a constitutional amendment but an initiative statute. The Washington act authorizes the establishment of municipal corporations to be known as public utility districts which may include any one or more counties of the state. To form such a district a petition signed by a certain number of qualified electors in each of the counties to be included shall be filed; whereupon a special election within the area specified in the petition shall be called. If, at the special election, the majority of the votes cast upon the proposition be in favor of the creation of such a district, the district shall then become a municipal corporation with the powers prescribed by the act.

No Adequate Salaries

The powers of the district shall be exercised by a "non-partisan" commission, consisting of a president and four commissioners, who shall hold office for six years. The first commissioners are elected, some for six years, some for four years and some for two years, so that thereafter the terms of the commissioners shall overlap. The president, who shall devote his entire time to the work of the commission, is provided with a salary of \$500 a month and the other commissioners are to receive \$250 a month. All the commissioners shall be paid for actual expenses incurred while away from home on business for the district. In districts with less than 150,000 registered voters the president shall receive \$250 a month and the commissioners \$125 a month. These salaries could hardly be called exorbitant. On the contrary, they are so low as almost to insure incompetent management. Even some of the smaller municipalities have discovered that a cheap manager is dear at any price. Stockton, California, pays its city manager \$20,000 a year and Sacramento is raising the city manager's salary from \$10,000 to \$15,000. Owing to the method of selection, the choice of commissioners goes to the locality within the district having the largest voting power, which would mean that the large cities would be well represented on such a board, and their interest in consequence safeguarded at the expense of the rural districts.

Powers of Public Utility District

The powers of a public utility district, under the Washington measure, are in brief:

TEXT of the proposed "Erickson Bill" providing for the establishment of public utility districts in Washington is given on page 243 and is here followed by comments on the dangers of the measure. This in the main will be the form in which the bill will be presented to the voters this fall although minor changes may later be made.

To construct, condemn, purchase or otherwise acquire or lease and maintain, operate, develop and regulate any form of property for generating electric energy by water power, steam or other methods, or for conserving, developing or distributing water for any purpose; provided that no public utility owned by a town shall be condemned

and just compensation must be made for any property taken.

Property may be acquired and operated either within or without the district for the purpose of furnishing the district and its inhabitants and any other persons "including public and private corporations within or without its limits" with water or power.

No Regulation of Rates

The district has "full and exclusive authority to sell and regulate and control the use, distribution and price" of water and power sold by it. In other words, these public utility districts, like all public ownership schemes, will not be subject to regulation by any neutral body. The agency that operates the business and supplies the service controls the price. Not only may rates discriminate arbitrarily between industries and types of service, but the commission has power to discriminate in rates between various communities. It also has the power by condemnation or negotiation to eliminate competition and thereby establish the condition of unregulated monopoly which proved so unsatisfactory in the days before real regulation.

The commission, however, shall not supply water to a privately-owned utility for the production of electric energy and shall not supply directly or indirectly to a privately-owned utility more than twenty per cent of the electric energy under its control, and contracts therefor shall not extend over a longer period than five years or be renewed prior to one year before expiration. This is a characteristic provision in such schemes. The utmost powers of oppression are conferred on the commission on the theory that it will be a beneficent tyranny but the commission is not trusted to the extent of permitting it to sell service to private utility corporations without hampering restrictions. Such provisions are a sop to the corporation-baiters, express a fundamental distrust of political management of utility service, and are at variance with the bureaucratic scheme of acts like the Washington measure.

A district is permitted to tie-in with a power plant or distribution system of any other district or municipal corporation and it may conduct water or power to any part of the state and sell water or power in any part of the state. In other words, a district has all the powers of a private utility corporation besides additional powers that no private utility corporation would think of asking for.

Dangerous Taxing Power

A district may contract indebtedness or borrow money on either the credit of the district or the gross receipts of the public utilities thereof and issue, as the case may be, either general bonds, which are obligations of the district, or utility bonds, which are obligations of the utility service.

In addition to thus raising revenue by borrowing, the district, by its commission, may levy an annual tax on all taxable property in the district not to exceed two mills in any one year "exclusive of interest and redemption for general bonds." That is to say, the commission may tax the district sufficiently to meet the interest and sinking fund obligations of the general bonds and is not required to depend on the receipts of the utilities to meet such general bonds; and on top of that the commission may levy a general tax of two mills for general purposes. The act provides, however, that principal and interest of general bonds shall be paid out of the net revenue of the district and any deficit out of the taxes. There is no limitation on the amount of general bonded indebtedness that may be incurred but if the proposed general indebtedness to be incurred will bring the indebtedness of the district to an amount exceeding $1\frac{1}{2}$ per cent "of the taxable property of the public utility district," the proposition of incurring such an indebtedness shall be submitted to the electors at the next general or special election. Bonds shall not be issued in that event unless three-fifths of the qualified voters of the district shall have authorized the general indebtedness and approved the system or plan. Evidently the limitation on general indebtedness that may be incurred by the commission without submitting the question to the electors is $1\frac{1}{2}$ per cent of the actual, and not merely the assessed value of the taxable property.

No Bond Limit

The initiative statute imposes no limit to the amount of bonds that may be issued by the commission without a vote of the people on the credit exclusively of the revenue of the utility bonds. The commission shall have power to create a special fund for the sole purpose of defraying the cost of any utility or extension thereof, into which special fund it may bind the district to pay a fixed amount of the gross revenue of such utility. Such bonds shall be payable only out of such special fund and shall not constitute an indebtedness of the district. The commission must not set aside into such special fund a greater amount or proportion of the revenues than in its judgment will be available over and above the cost of maintenance and operation. No provision is made for taking over the utility service by the holders of such utility bonds if the special fund fails to meet

the obligations of the bonds. Obviously, if the utility service is not a success, the expense of maintenance and operation must have a first call on the entire gross revenue else the utility would come to a stop. Such utility bonds, therefore, are merely promises to pay out profits, if there are any profits.

Other Special Powers

The measure provides for the purchase of materials and the doing of work in excess of \$5,000 by contract let to the lowest responsible bidder, and the act provides that every contractor or sub-contractor performing any work for such district shall pay to its employees under such contract or sub-contract not less than the minimum scale fixed by the commission in the notice and called for in its bids.

Prior to the receipt of taxes raised by levy, the commission may borrow money or issue warrants on the district in anticipation of the revenue to an amount not to exceed the anticipated revenues of one year, and such warrants shall be redeemed from the first money available from such taxes when collected. The commission has the widest powers in making contracts and engaging employees, and there is a special grant of power "to print and publish information or literature," which means propaganda in favor of the district, its works and its commission.

All suits against the district must be brought in the county in which the commission maintains its headquarters.

The commission may also establish local assessment districts within the general district for the distribution under the general supervision or control of the commission of water or electric energy for any purpose and to provide for the purchase or acquisition otherwise of distribution systems for said purposes, and to levy and collect, in accordance with the special benefits conferred on districts, assessments on the property especially benefited thereby; and the commission may also issue local improvement bonds or warrants to be collected wholly or in part by local assessments.

No Recourse for the Public

It is clear that in each public utility district (and there is nothing to prevent a public utility district from including the entire state) the commission may exercise very great powers, including the power to tax, the power to contract general indebtedness of the district and the power to pledge the revenues of the utility services, the power to impose local assessments on territory within the district deemed especially benefited, and the power to fix its own rates and determine for itself the character of the service it shall give.

The vices of the Washington measure are the vices of public ownership projects generally: political and bureaucratic control of industries through governmental agencies; freedom from regulation; the power to eliminate the corrective influence of competition, although competition is the public's only protection where there is no regulation; the power to tax the people to meet expenses and losses in more or less speculative enterprises which are proprietary and not governmental in character.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

IN my article published in the Aug. 1, 1923, issue of the Journal of Electricity, I advised the adoption of a uniform accounting system by the electrical contractors and dealers in the Pacific states as an important factor towards the solution of their troubles. I now intend going a few steps further and in this series of articles I shall outline in some detail a simplified accounting system that I have devised and installed for numerous electrical contractors and dealers. This is to be done with the hope that I shall be successful in bringing about the adoption of some practical system so vitally necessary in this industry.

An accounting system correctly installed and operated should furnish the following important groups of information: sales, material and labor costs, and overhead expenses; so that, firstly, the amount of gross profit on sales may be ascertained by deducting the amount of material and labor costs from the amount of sales and, finally, the amount of net profit from operations by deducting the amount of overhead expenses from the amount of gross profit on sales. From these groupings the exact percentages of overhead expenses to material and labor costs can be obtained, so that it can be known positively how much should be added to estimated material and labor costs to cover the overhead fully and leave a fair margin of net profit on the work. This knowledge of the amount that should be added to material and labor costs, to cover overhead expenses, is the most essential thing in the operation of the business.

The following chart of general ledger accounts affords the necessary detailed classification to furnish the above information at the end of each closing period:

CHART OF ACCOUNTS			
Assets			
General Ledger A/c No.	Current	General Ledger A/c No.	Fixed
1	Bank Account	20	Automobiles
2	Petty Cash Fund	20A	Provision for Depreciation
3	Accounts Receivable	21	Furniture and Fixtures
3A	Provision for Doubtful Accounts	21A	Provision for Depreciation
4	Notes Receivable	22	Tools and Equipment
10	Merchandise	22A	Provision for Depreciation
11	Labor in Process		
Liabilities			
30	Accounts Payable	31	Notes Payable
Net Worth			
40	Capital Account	41	Personal Account
Revenue			
50	Sales	52	Cost of Goods Sold
51	Returns and Allowances		

General Ledger Account No.	Expenses
60	Advertising
61	Automobile Expense
62	Depreciation
63	Doubtful Accounts
64	Freight, Drayage and Express
65	Heat, Light and Power
66	Insurance
67	Interest and Discount
68	Miscellaneous Expense
69	Rent
70	Salaries
71	Stationery, Printing and Office Supplies
72	Taxes and License
73	Telephone and Telegraph

The main books of account required in the operation of this system are the combined cash book-journal, general ledger, and accounts receivable and accounts payable ledgers.

The combined cash book-journal, the most important cog in the entire machinery, is a nineteen-column divided loose-leaf form conveniently arranged with three amount columns to the left of the page used for the bank transactions and headed from left to right as follows: Balance, Deposits Dr., and Checks Drawn Cr. Reading from left to right across the page there follow the date column, description space, and check number column. These are followed by sixteen amount columns which are given the proper headings to facilitate the postings into the general ledger accounts and for the normal size business are as follows: Accounts Receivable—Dr. and Cr., Accounts Payable—Dr. and Cr., Sales—Jobs and Store Cr., Merchandise Dr., Labor Dr., Automobile Expense Dr., Freight, Drayage and Express Dr., Interest and Discount—Dr. and Cr., Salaries Dr., Personal Account Dr., and Sundries—Dr. and Cr.

The use of this book is similar in effect to that of the old-style day book inasmuch as each transaction of the business is recorded one after the other as they occur, but in accordance with the double entry method of bookkeeping now in general use, the amounts of these transactions are entered in the proper columns, an equal debit and credit for each. For example, when a sale is made to a customer on a charge account, the date of the transaction should be entered in the date column, the customer's name and address in the description space, the amount of the sale in the accounts receivable debit column and the same amount in the sales credit column, either jobs or store. When an invoice is received for merchandise purchased, the date under which the entry is being made is entered in the date column, the name of the firm from whom the invoice is received and the date of same in the description space, the amount of the invoice in the accounts payable credit column and the same amount

in the merchandise debit column. When cash or check is received from a customer in payment of account, the date received is entered in the date column, the name and address of the customer in the description space, the amount received in the accounts receivable credit column and the same amount in the bank deposits debit column.

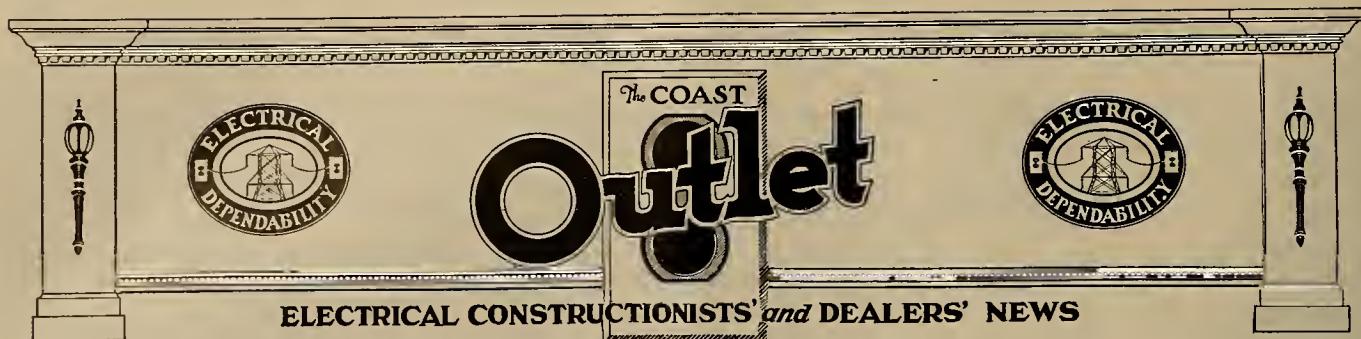
When a check is issued in settlement of an account, the date of issue is entered in the date column, the name of the firm to whom the check is made payable in the description space, the number of the check in the check number column, the amount of the check in the accounts payable debit column and the same amount in the bank checks drawn credit column. If a cash discount has been deducted in settlement, the total amount of the account paid should be entered in accounts payable debit column and the amount of cash discount deducted should be entered in the interest and discount credit column. This same rule applies if a customer in paying an account deducts cash discount; the total amount of the account paid should be entered in the accounts receivable credit column and the amount of cash discount deducted entered in the interest and discount debit column.

The totals of each column of this book are carried forward from page to page until the end of each month at which time the book is closed and posted. A continual proof of the work is obtained at the end of each page by adding the totals of the debit columns and adding the totals of the credit columns, the totals of which should agree. In case there is a difference between the two totals, it is very easily located as the correctness of entries on only the one page have to be verified. With this book in balance at the end of the month, the general ledger trial balance is practically assured as there is very little possibility of a mistake occurring in the few postings into the general ledger from this book. If there should be a difference, the small number of postings to be checked makes it very easy to locate.

The balance column in the bank department is not totaled as this column contains the daily balances in the bank and has no connection with the balancing of the cash book-journal. The amount of the balance in the bank is brought forward in this column on the first of each month from the preceding month and the amount of the balance in the bank at the end of each day is ascertained as follows: the total of the first day's receipts in the deposits debit column is added to the balance in the bank at the beginning of the day and from this amount the total of the checks drawn for that day shown in the checks drawn credit column, is deducted. Small pencil totals are made in the two columns at the end of each day and the difference between the previous day's total and the final total is the amount of the daily deposit and checks drawn, respectively. This amount of the daily deposit is added to the previous balance in the bank as shown in the balance column and the amount of the daily checks drawn is deducted, the difference being entered as the balance in the bank at the end of the day. This operation is repeated each day and the daily balance in the bank thus ascertained can be verified as to correctness by adding the total of the deposits debit column to date to the balance in the bank on the first of the month and deducting the total of the checks drawn credit column to date, the amount obtained being the same.

Under this system all cash and check receipts are deposited in the bank daily and all cash disbursements are made from a petty cash fund established for that purpose. This permanent working fund is established by drawing a check for an amount sufficient for the needs of the business and is charged to the general ledger account called petty cash fund. This account should never be affected unless it is decided at some later date to increase or decrease the permanent amount of the working fund. The petty cash drawer should at all times contain cash or cash and paid vouchers to equal this amount. As the fund becomes depleted it should be reimbursed with the amount expended by drawing a check to petty cash for the total of paid vouchers in the drawer and cashing it at the bank, charging the proper accounts for which the expenditures have been made according to the paid vouchers which are replaced.

The totals of all columns, with the exception of the sundries debit and credit columns, are posted monthly to the general ledger accounts as follows: deposits debit column to the debit of bank account No. 1, checks drawn credit column to the credit of bank account No. 1, accounts receivable debit column to the debit of accounts receivable controlling account No. 3, accounts receivable credit column to the credit of accounts receivable controlling account No. 3, accounts payable debit column to the debit of accounts payable controlling account No. 30, accounts payable credit column to the credit of accounts payable controlling account No. 30, sales—jobs and store credit columns to the credit of sales account No. 50, merchandise debit column to the debit of merchandise account No. 10, labor debit column to the debit of labor in process account No. 11, automobile expense debit column to the debit of automobile expense account No. 61, freight drayage and express debit column to the debit of freight, drayage and express account No. 64, interest and discount debit column to the debit of interest and discount account No. 67, interest and discount credit column to the credit of interest and discount account No. 67, salaries debit column to the debit of salaries account No. 70, and personal debit column to the debit of personal account No. 41. Amounts entered in the sundries debit and credit columns affecting accounts for which no special columns have been provided are posted in detail to the proper accounts in the general ledger. The amounts appearing in the accounts receivable debit and credit columns are posted in detail to the debit and credit respectively, of the individual customer's accounts in the accounts receivable ledger and at the end of each month the total of the balances of these individual customers' accounts should agree with the debit balance of the accounts receivable controlling account No. 3, in the general ledger. The amounts appearing in the accounts payable debit and credit columns are posted in detail to the debit and credit respectively, of the individual creditor's accounts in the payable ledger and at the end of each month the total of the balances of these individual creditors' accounts should agree with the credit balance of the accounts payable controlling account No. 30 in the general ledger. This constitutes a concrete proof of the accounts receivable and accounts payable postings and is one of the most essential features of the entire accounting system.



Why I Belong to the Electrical Contractors' and Dealers' Association

By C. T. SMALLCOMB

Second Vice-President, Electrical Contractors' and Dealers' Association,
Los Angeles, Calif.

The number of contractor-dealer organizations is increasing rapidly. The scope of their operations is widening and their effect is becoming more evident. With few exceptions these organizations have worked constructively and have done much to improve the condition of the merchant and his position before the public. Those members who have supported the organization movement and who have sincerely worked for the association have generally benefited in direct proportion to the effort they have put forth. Some members have been content merely to hold membership and, in some cases, have not even attended the meetings. This is a good deal like having a home and not participating in its family life. No man can hope to get out of his home life any more than he contributes to it and it is so with his business associations. They will make returns to him that far exceed his expectations if he will only show a little human interest and participation.

To all of us who are in the electrical contracting business, there should be that feeling of giving everybody you come in contact with, a square deal. To your jobber you owe a correct account of your assets and liabilities, and to those who extend you thirty, sixty or an unlimited number of days' credit, you should outline your business policies, your way of keeping books, your way of arriving at the selling price of an installation or piece of apparatus. All these should be taken up with your jobber in order that he may help you in carrying out a successful business program. It must be remembered that, as a general thing, the jobber is old in the business. He can point out or refer back to many electrical contracting derelicts that have gone on the rocks or are well on their way and in most cases he, the jobber, is holding the sack. Therefore, it stands the contractor in good stead to confide in the wise old jobber that he may profit by his experiences. If for no other reason than that of being honest with your jobber and yourself, you should cooperate with him.

Next in line is your competitor. Business without competition does not exist. To be fair with your competitor is essential to successful business. To slander and belittle him is to tear down your own prospects. It lowers the standard of your business, and cheap-

ens your character. This, in turn, makes everyone suspect you as well as your competitor. To tell a customer that you are there to sell your kind of material, your style of installation and your kind of service, is being fair with your competitor. The field is no place to unload your feelings regarding certain kinds of competition. There is a place for that.

Next in line is the electrical inspection department. What is it that makes so many electrical contractors down on the inspector? My answer is, "lack of cooperation." I do not know one electrical contractor in this city who has trouble with inspections if he tries to do the right thing by this department. It is only the contractor who tries to deceive, tries to get away with some raw deal on a job, that is always harranguing with the inspection department. There is the exception of the contractor who does not know the requirements except in a misinterpreted manner. It is through the Electrical Contractors' and Dealers' Association that the contractor is able to meet with the heads of the inspection department at their weekly meetings at the association headquarters. What a very splendid opportunity this meeting gives each and every one of us—that of discussing old and new laws and getting the right interpretation when necessary. What more can one ask?

Now for the customer. As a general rule his education is sadly neglected when it comes to electrical installations and so he is apt to be guided by the lowest price, unless he has the idea of quality in mind or has been "priced" before by some ninety-day contractor. To be fair with the customer you cannot use methods to defraud him. I mean by that, to figure and scheme to see how low you can quote him and trust to luck that there will be some other way to slip up on the job in order to make your profit. To be fair with the customer and to yourself, it is self-evident that a good quality of material installed in a workmanlike manner at a price consistent with that kind of installation is necessary. I certainly believe that to be fair with a customer and to have him satisfied, it is necessary to have satisfied help who reflect optimism on their jobs. That means fair wages. In reference to the price of a job, the contractor's overhead should be arrived at intelligently and added to the

cost of labor and material and then a fair margin added for profit.

A good installation, a satisfied customer and a profit to the contractor means everything and until the electrical contractor establishes that reputation he is going to have hard sledding, slim pickings and more than likely will end up in bankruptcy proceedings.

Now, how are we going to bring about a condition of fairness to ourselves with the jobber, competitor and customer? There is but one answer, "cooperation," and cooperation means association and the Electrical Contractors' and Dealers' Association is fulfilling association functions.

Let us all work out a plan that will carry out the idea signified on our emblem, "Quality, Service and Responsibility," then each and every one of us contractor-dealers can put our hearts and souls into developing that plan.

Large Attendance at Stockton Meeting of Association

The regular quarterly meeting of the California State Association of Electrical Contractors and Dealers was held at the Hotel Stockton, Stockton, Calif., March 15. More than 200 members were present from practically all Sacramento and San Joaquin valley towns and from the San Francisco Bay district. Those members who came from the Bay district took the steamer "J. D. Peters," of the California Navigation & Improvement Company's line, at six o'clock on March 14. Special arrangements had been made by Walter F. Price, executive secretary of the association, and the steamship line provided every means for the comfort and convenience of the travelers.

The executive committee met at ten-thirty on the morning of the fifteenth and in the afternoon an open session was held. Several papers were presented, all being of unusual merit and interest. J. H. Lavenson, of Alexander & Lavenson Electrical Supply Company, San Francisco, Calif., gave a talk on "Credits" and discussed many of the various phases of this part of a dealer's business. George E. Kimball, of the Industrial Accident Commission, presented a paper on "Live Wires and Live Wiremen," in which he presented some facts that are of application and interest to every contractor, dealer and central station employee. F. V. Mitchell, public accountant, gave a tabular view of the contracting business, based on the study of a large number of operations covering the period of a year. He pointed out the necessity for more accurate accounting, leading to better knowledge of job costs and consequent elimination of price cutting on estimates.

Employee Relations Discussed at Sacramento Dealers' Dinner

The regular monthly meeting of the Sacramento Valley Electrical Society was held at the Hotel Land, Sacramento, Calif., on Wednesday, March 11, at 6:30 p.m. "Hal" Willis of the San Francisco-Sacramento Railroad presided.

Jessie Cane, student of the Sacramento high school, spoke on the organization of an Engineers' Club at the local high school which plans to foster the study of engineering by more students and afford those interested a means of association with others following like pursuits. The Sacramento Valley Electrical Society extended a standing invitation to any of the members of the High School Club to attend any of its meetings.

The program of the evening was in charge of the Pacific Telephone & Telegraph Company of Sacramento. The principal speaker, Frank McNally, division commercial superintendent, spoke on "The Relation of Employer to Employee," covering this important subject in a very interesting way. He pointed out the necessity of human relations entering into all dealings of the employer with his employees. He spoke of methods used by the telephone company, namely, handling all problems through their employees' association, selling stock to employees under the market price, two weeks' vacation with pay, health benefits, insurance without cost, and unbiased promotions. Mr. McNally summarized the things that the employer and employees desire as follows: The employer wants (1) industrial peace, (2) improvement in the quality and quantity of work done, (3) reduction in the cost of production, not by lower wages nor by skimping the work, but by improved methods, (4) higher efficiency on the part of the employee, (5) attentiveness and interest of the worker in his work and in his fellows, and (6) loyalty and confidence on the part of the employee. On the other hand, the employee wants (1) higher wages, (2) better personal relations with his superiors, (3) good working conditions, (4) a square deal, (5) steady work, and (6) a chance to better his position.

A movie entitled "The History of the Telephone" was shown which traced the development from Bell's first instrument to the present time. This was followed by a reel entitled "Making Voice Highways" which showed the processes involved in the manufacture of the modern telephone cable.

General Electric Meetings Held to Introduce New Lines

The General Electric Company has been holding a series of special motor meetings to tell the trade the story of two new motor products they are putting on the market. One of these meetings was held in the lecture room of the Pacific Gas and Electric Company, Sacramento, Calif., Wednesday, Feb. 26, at 7:30 p.m. Nearly 150 members of the industry were in attendance. The meeting was presided over by W. J. Delehanty, resident representative of the General Electric Company in the Sacramento territory.

E. O. Shreve, manager of the General Electric Company, San Francisco, welcomed those in attendance and spoke of

the humanitarian policies of the company.

Oscar Schlesinger, manager of the apparatus department of the Western Electric Company, San Francisco, Calif., gave a brief talk on motors. M. H. Rhine, manager of the marine and industrial department of the General Electric Company, San Francisco, spoke on the development of the mercury turbine and on electrically operated ships.

Frank E. Boyd, of the General Electric Company, San Francisco, spoke on the new types of motors just being placed on the market and gave a detailed description of their characteristics. C. T. Hutchinson, vice-president and general manager of the McGraw-Hill Company, San Francisco, was a guest of the evening.

Similar meetings were held at Chico, Santa Rosa and Marysville.

San Diego Will Have Another All-Electric Home

Another electric home is being planned in San Diego, Calif., by the Electric Club of that city. So successful from an advertising standpoint was the last electric home there that a committee, headed by Alex Shreiber, is working out details at the present for a new home to be opened to the public this fall.

"We are going to profit by the experiences with the last electric home," declared Mr. Shreiber, who built, and made many of the arrangements for the previous home. Mr. Shreiber is a San Diego builder, believing in electric home-building, and a prominent member of the San Diego Electric Club. "While it is often hard to see any tangible results right at the very start, the results derived by the industry from the last home have shown themselves without question.

"We did not at once dispose of the last electric home but lived in it ourselves. Not long ago it was sold to a woman and at the time of purchase she declared that she did not want electric heating. She asked me to remove the electric radiators but being busy I did not have time to do it for a week or so. When I went back to take out the radiators she had been so completely satisfied with the heat from them that she gave me a check right away and kept the radiators.

"The homes that I have built since have all benefited from the last electric home. People ask for more outlets and the dealers report to me increased sales of electrical equipment, such as two-way sockets, etc., showing that many are trying to get the convenience of outlets from present installations. In the electric home I just spoke of the woman who bought the place was not satisfied with the number of outlets we had put in it. And we thought that we had put in plenty. Shortly after she bought it she had more outlets put in.

"Whitney and Company here, a bargain type department and 5, 10 and 25 cent store, used to have a small counter with a few electrical supplies. Mr. Whitney himself told me that after the electric home display he had had to enlarge the space allotted to electrical goods and had cleaned up a lot of stock from the increased demand he attributed to the home. So you see we are all helped by it."

Association Formed by Portland Contractors and Dealers

Organization steps have been completed for the formation of the Portland, Ore., Association of Electrical Contractors and Dealers in that city. Following a series of preliminary meetings permanent officers have been elected and a constitution and by-laws adopted. The organization has an initial membership of approximately fifty firms and individuals, the following officers having been elected for 1924: W. E. Morgan, Morgan & Galloway, president; F. C. Peterson, Main Electric Company, secretary, and Stanley Lutz, Stanley Lutz Company, treasurer.

Association activities in Portland have been at a standstill for nearly two years and the organization of the present body marks the first concerted action for cooperation among this group since the dissolution of the Oregon State Association in the spring of 1922.

The scope of the present association is very broad. The objects for which it has been organized as set forth in the constitution follow:

To promote the welfare of its members.

To distribute among its members the fullest information obtainable in regard to all matters affecting the electrical contracting and retail electrical merchandising business.

To collect data relating to the business of electrical contracting and retail merchandising.

To aid in bringing about more friendly relations between electrical contractors and electrical retail dealers, and others engaged in the electrical industry.

To elevate the standards of electrical installations.

The organization plans call for the formation of five bureaus, to one or more of which each member is assigned upon election to membership. These bureaus are divided into the following classifications: Retail, Fixture, Motor, Knob and Tube Wiring, and Conduit Wiring. Chairmen of the various bureaus are elected by the members and automatically form, together with the president, the executive committee of the association.

As a special duty, these chairmen act as a board of arbitration to settle any business difficulties between members of the association or any jurisdictional differences between the bureaus.

Members of the organization are defined as persons, firms or corporations engaged in the business of electrical contracting and repairing, including the installation of electrical apparatus and supplies, or engaged in the retailing of electrical supplies or in both contracting and retailing. Qualifications for membership are very broad. As set down in the constitution they are:

"For the purpose of determining whether an individual firm or corporation is engaged in the business as an electrical contractor or dealer, the following definition shall be used: An electrical contractor or dealer shall be any individual, firm or corporation carrying a general stock of electrical supplies for retail sale, or who may be prepared to make electrical installations."

Dues in the association are nominal, all members paying the same, namely, \$12 per year.

Meetings are held every Monday night in the Portland Builders' Exchange.

JOBBER, DEALER AND SALES AGENT



There's Money for You in the Other Man's Contest

Window Display Contests Offer Opportunities to Sell Better Lighting Installations to Retail Merchants

Window display contests when conducted among dealers in the electrical industry have done much to increase the sales of electrical devices. The value accruing to the electrical industry from similar contests among non-electrical merchants has for some time been disregarded. The electrical dealer has felt that the only person benefiting from the special display has been the merchant that is responsible for it.

That there are opportunities for the electrical contractor, dealer and power company to capitalize on the window display contest being conducted by any class of merchants, cannot be denied. The purpose of each merchant entering the contest is to display his goods to the best advantage and to secure the best results from the exhibit proper illumination must be used.

This desire to present an attractive display to the public offers to the electrical industry an excellent opportunity to engage in constructive illumination sales work. The display itself may not warrant the expense of installing a new lighting system in the show windows, but the illumination salesman can, through educational sales work, show the merchant that the value of the modern window lighting installation will not pass with the particular display that is to be featured in the contest. The actual incentive to do the work at the particular time is present and the merchant will be in a more receptive frame of mind at that time than at any other.

The value of the window contest, as far as the electrical industry is concerned, is not confined entirely to the actual number of jobs that are sold prior to the display. The fact that the show windows that attracted the most attention at night were well illuminated will be found to be one of the best talking points that the illumination salesman can use. The period immediately after the contest also offers exceptional opportunities to sell better show window lighting.

As one step toward helping the retailers of Salt Lake City, Utah, capitalize the event of the Utah State Fair and Mormon Church conference, which were held in that city last fall, a window dressing contest was conducted by the Inter-mountain Retailer, the official organ of the Utah Retail Merchants' Association, in conjunction with the Rocky Mountain Electrical Cooperative League. Cash prizes aggregating \$100 were awarded, the first prize being \$50, the second \$25, the third \$15, and the

fourth \$10. Everyone in the city having frontage and using plate glass, was invited to participate, and a large number of merchants entered the contest.

The Rocky Mountain Electrical Cooperative League took considerable interest in the Salt Lake City window dressing contest and stood behind the Utah Retail Merchants' Association in sponsoring it. Merchants that cared to secure advice from the members of the league concerning lighting effects could do so at no cost to them. As a result, some of the windows were much better illuminated than they would have been otherwise.

The underlying idea in the contest was to urge every retailer to an appreciation of the value of alluring windows. Proper lighting was one of the main considerations in judging the relative merits of the various windows.

The judges were Prof. A. C. Carrington, retail store management expert from the University of Utah; H. W. Pickering of the Porte Publishing Company, and Earl J. Glade, editor of the Inter-Mountain Retailer.

First prize was awarded to the Schramm-Johnson Drug Company for its window exploiting perfumes; Zion's

Cooperative Mercantile Institution won the second prize for its window displaying ladies' furnishings; Kimball & Richards were given third prize, and the Walk-over Shoe Company fourth prize. In each of the prize-winning windows, as well as those of several of the other contestants, the lighting effects were very good. In many cases, according to the opinion of the judges, higher scores would have been made, had more attention been given to proper lighting.

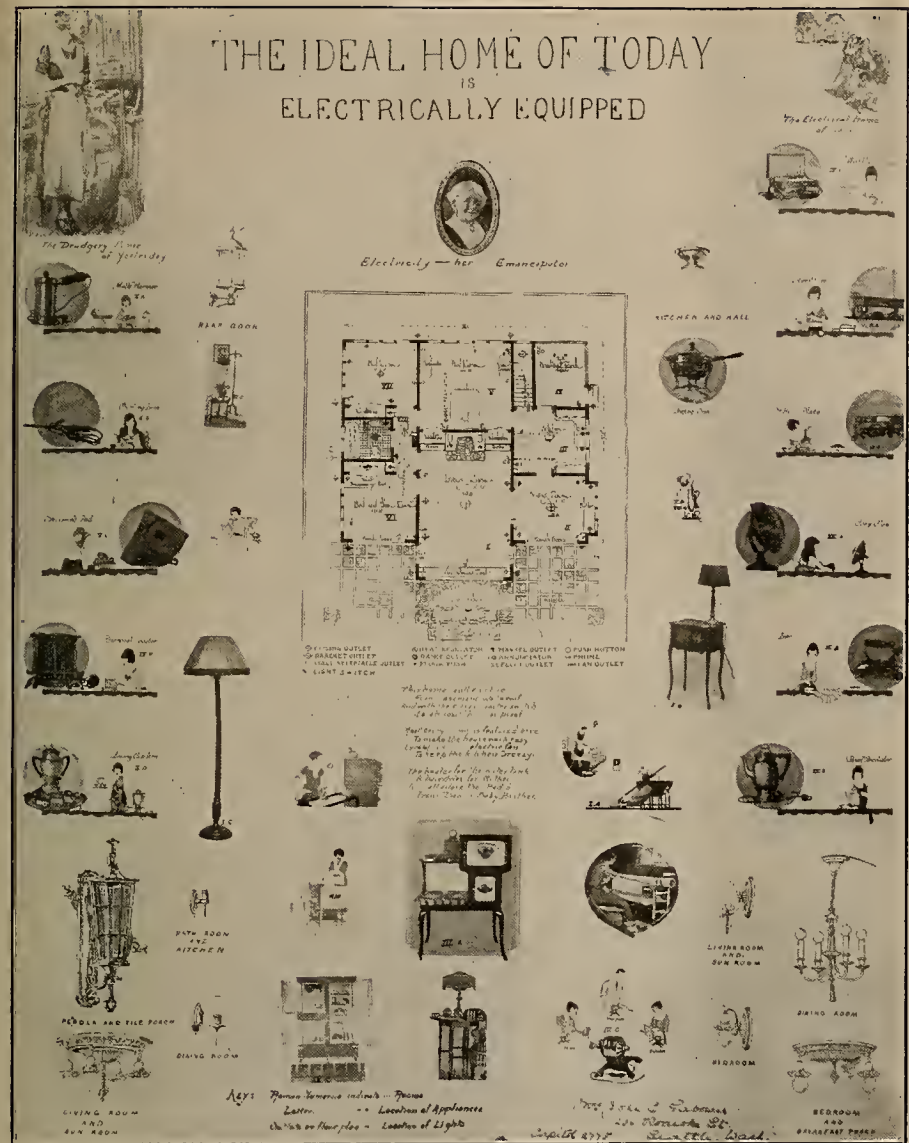
The windows were judged principally upon the following points: the idea—its potency as an attention getter, interest arouser, and general selling stimulus; the mechanical technique, such as selection of material for display—the balance—the coloring effects—the general harmony—the lighting—the general structural arrangement—the unity of appeal.

In making their decisions the judges stated that lighting of stores and show windows is one of the most vital factors in dressing up the appearance of Salt Lake City's main thoroughfares, and that a great deal of attention should be given to this matter by the merchants.

The results of the window display contest were most satisfactory as far as the electrical dealers in Salt Lake City were concerned. Retail merchants of the city were shown that better illumination of not only their show windows but also their store rooms was a desirable thing.



The display of the Schramm-Johnson Drug Company was awarded first prize in the Salt Lake City contest.



First prize in the outlet contest was awarded to the woman that submitted the layout reproduced above.

Creating Interest in the Educational Exhibit

Electric Club of Seattle and Daily Paper Cooperate to Attract Attention to Need for Electrical Devices in Home

A most successful publicity "stunt," which attracted considerable attention to the electric home exhibit of the Electric Club of Seattle, Wash., was used in connection with that club's electric home and appliance show conducted in Seattle last fall. The "stunt" consisted of a contest among the women of the Northwest and was designed to create interest in the electric home exhibition and in the various electrical devices that should be in the home. The contest was presented by one of the leading newspapers.

The contest was centered around a floor plan of a six-room house. This floor plan was reproduced in the newspaper and the women that desired to enter the competition were instructed to indicate on the floor plan the places where they thought the various types of outlets should be placed and also where they would locate the necessary electrical appliances. Symbols for the various types of outlets were provided and the contestants were advised that

they should use their own symbols for the appliances.

The first prize in connection with the contest was awarded to Mrs. John C. Gabourel of Seattle. Mrs. Gabourel presented a most complete plan by which she showed that she had given careful consideration to the location of the various types of outlets and in addition to this she recommended the use of a large number of electrical appliances. The required symbols were used to indicate the location of the outlets but Mrs. Gabourel made a decided departure from the commonplace in the way that she indicated the use of the electrical appliances. Illustrations, cut from magazine advertisements, were used to show what she deemed necessary for the modern home. Each of these illustrations was captioned by a key number that indicated where the device was used in the home. Similar key numbers appeared on the floor plan and indicated the exact location of each electrical appliance.

An Executive Secretary Publishes a Peeve Re Putting Out the Prunes

By JOE OSIER

"Bill Shakespeare, the celebrated hand-to-hand word balancer, must have had me in mind when he released for publication that smart crack:—

"No sighs but of my breathing; no tears but of my shedding!"—

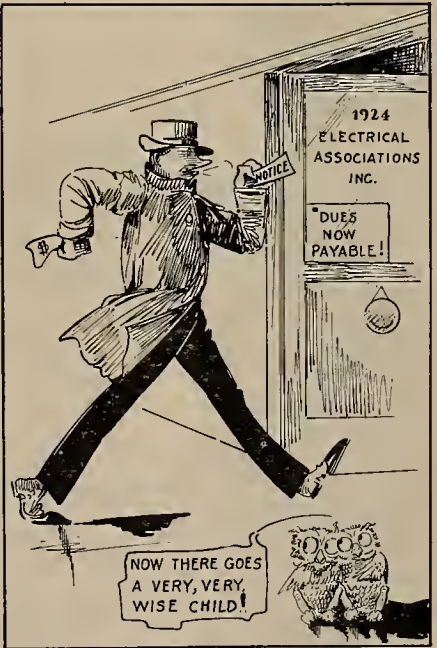
Blubbered Bertha Bigenough, the underslept and underpaid executive secretary of a certain local association, as she noisily snapped her chewing gum and ran a set of freckled fingers through a second class marcel.

"And, you can tell the pink-eyed world for me that any Bird-member of this organization—who flits into this cage and puts out birdseed for dues, is not doing me a favor.

"And, honest to Freddie, I'm sick of having them act like they are. 'Tain't my association. If it was, I would attend the meetings and pay my dues.

"Laugh that off.

"I'm just putting in my time here—trying to snare a little scenery to cover my ol' carcass and my main job is sending out notices of meetings and trying



"If your dues are due, do pay!"

to collect dues that have been due since the original rally of the charter members—and—

"Listen! My job is a big take.

"I'm Frank and Ernest—both—when I admit that some of these, now, association members give me the heebie jeebies, anyway. When they do attend the luncheons or the meetings—which is seldom—they act like they are painted on the furniture or else they pop off like a Red at a radical reunion—spieling much and saying nothing—but—

"That ain't my chiefest squawk. I don't really care whether they make the meetings or not, but I would like to have 'em come in with their clams for membership fees without me giving them a canvass talk as long and as wet as 'Toastie's Good Buy.'

"Have you paid your last dues? And if not—why not?"

Keeping the Firm Name Before the Public's Eyes

Continuous Series of Advertisements Found to Be Best Means of Attracting Attention of Customers to Stores

Robert Bruce discovered that it was the continuous effort of the spider that finally placed that animal where it could continue its self-assigned task of weaving its web. This same principle, that repeated efforts in the same direction will in the end produce results, has been found to be the basis of much of the advertising matter of the present day. The advertiser is rightly of the opinion that to get his idea and his product before the public, he must constantly "hammer the thought home" through whatever advertising channels he uses.

Hit-and-miss advertisements, whereas they may be of some value in attracting occasional purchasers to the merchant's place of business, are not true examples of the art of advertising. The occasional purchaser is not the customer that the advertiser is seeking to draw to his store. The customer that will be a constant patron of the merchant's establishment whenever he is in the market for the material that the merchant

customers will return depends largely upon the service that they get on their first visit to the store and also upon the aggressiveness of the merchant's advertising. Old customers can be brought to the store by remembrances of good service and quality merchandise secured there before and by advertisements telling of articles that they are wanting.

To bring both the new customer and the old one to the store, the merchant cannot rely upon spasmodic advertising. A full-page spread twice a year will not have the effect upon sales that a smaller space used at closer intervals will have. Advertising specialists agree that it is the continuous and consistent advertiser that shows the greatest volume of sales at the end of the year. Though the character of the advertising may be changed any number of times, the advertiser that uses space regularly at short intervals will benefit more than the spasmodic advertiser. The regular presentation of the name of the concern, in addition to the value of each particular advertisement, will serve to place the firm's name in the mind of the reader with the result that he will immediately think of the advertiser when in need of the latter's line of merchandise.

The department store is probably one of the best examples of the consistent newspaper advertiser. The merchan-

dising establishment generally sees that an advertisement of some character is published each day in the leading dailies of the cities in which it operates. The space that is taken is varied according to the merchandise that is being advertised on the particular day, but the fact that the name of the store should be presented each day is not lost sight of by the advertising manager.

The British Columbia Electric Railway Company, Vancouver, B. C., believes in continuous and not spasmodic advertising, as is evidenced by a series of good-will advertisements which has been running in British Columbia papers for the last six months and will be run indefinitely, according to James Lightbody, publicity manager of the company.

The advertisements are small in size, being only two columns by 5 in., and are run in six dailies and nine weeklies, one advertisement being run each week. In a number of these papers, the company had been advertising for several years but when the series was started, the space was standardized at the size mentioned.

The advertisements are set up at a job printing plant and electros are made for each paper, thus insuring a uniform appearance, conforming with the style of all the company's advertisements. The cost of this is comparatively small and is well repaid in the added attention the advertisements receive.

The tone of the copy has been to feature the company's desire to give service and the various employees are now being depicted.

Thousands Visit Hollywood Electric Home Exhibit

**Mediterranean Type Home Completely Electrically Equipped and
Furnished Throughout Open for Over Four Weeks**

The interest of thousands was aroused during the showing of the Hollywood electric home in Los Angeles, Calif., from Feb. 28 to March 30, when the home was open to public inspection daily from 2 to 10 p.m., under the auspices of the California Electrical Co-operative Campaign.

The Hollywood electric home has a superb setting, nestled in the hills of Hollywood, just under the cross made famous by the Pilgrimage Play, and was designed by J. S. Powell, architect of the staff of Reed & Company, designers and builders, who constructed the building with the cooperation of the California Electrical Cooperative Campaign. The home was furnished and decorated by Barker Brothers, furniture dealers of Los Angeles. The home is of the Mediterranean type and is constructed of white stucco, with two stories and roof garden.

The approach to the home is by way of a winding double stairway, at the head of which one enters a round entrance hall which is flanked by the living room on one side and the dining and breakfast rooms on the other, while the smoking room is just beyond the living room. Just in the rear of the dining room is the kitchen, while to the left is an enclosed rear porch.

Upstairs are three spacious bedrooms, each with individual bath and dressing room, while the entire top floor of the home is converted into an open-air

room, with tasteful awnings, wicker furniture, a fountain filled with goldfish and an open air fireplace, which permits the turning of this place into a sleeping porch if desired.

Each of the rooms in the home was completely outfitted with electrical appliances and devices. The kitchen has a built-in electrical refrigerator, built-in dish washer and numerous other electrical features. The Hollywood home is heated electrically and equipped with electric water heater and electric range.

Throughout the home are numerous convenience outlets, which were indicated with a hand pointing to each, so as to attract the attention of the public. The photographs reproduced on page 255 give an idea of the completeness of the electrification of the home.

During the time the home was open, a considerable amount of advertising and publicity was given to it through the press as well as through the mailing of special prepared folders and by the display of automobile windshield stickers, arrow cards and banners on street cars.

The Hollywood electric home told aptly and well the story it aimed to get before the public, namely, that it is upon the care and completeness of the electrical wiring of the home and the number and accessibility of the convenience outlets in every room that the entire measure of household comfort depends.

[illegible]

An example of the type of advertisement being used by the British Columbia Electric Railway Company.

carries, is the one that the advertiser is anxious to reach by means of the advertisement.

The aim of the advertiser is two-fold. He wants to secure new customers and he wants to keep his name and products before the minds of old customers. To the first class he desires to make the initial sale and in so doing make old customers that will instinctively turn to his store to secure similar merchandise in the future. Whether the new



THOUSANDS of people living in and around Los Angeles visited the Hollywood electric home to find that electricity solves many of the problems of making the home modern. The illustrations on this page show what was done in hall, dining room, bedroom, dressing room and kitchen to make the home completely electrical. Convenience outlets were located at every point where the home-owner could possibly want them and during the time that the home was open to visitors small signs called attention to the outlets.



INDUSTRIAL NEWS



Suggests Black or Mojave Canyon Dam to Control Colorado

In a statement issued by R. H. Ballard, vice-president and general manager of the Southern California Edison Company, supplementing his testimony before the irrigation committee of the House of Representatives, Mr. Ballard declared that flood control is the primary requirement on the Colorado River. He contended that this could be accomplished in two or three years under a co-ordinated general plan under which the sale of power would pay the costs. He also stated that the expense of the proposed Boulder Canyon Dam—officially estimated at \$55,000,000 for the dam and \$49,000,000 for generating and transmitting 600,000 hp. of electrical energy—is far too great and would pile up a deficit of \$52,000,000 in the first fifteen years, and that this plan would besides leave the Imperial, Coachella, Palo Verde and Yuma Valleys in continued danger during the eight or ten years it would take to build the dam.

In his statement Mr. Ballard says:

"Investigation of the water records on the Colorado River show that, with storage capacity for flood purposes of 5,000,000 acre-ft., the maximum flow at flood times can be reduced to less than one-quarter of what it would be without such storage. The small remainder can easily be handled by the flood-control works now installed in the Imperial Valley District. A dam slightly more than 300 ft. high would provide this amount of storage at either Glen Canyon, in the Upper Basin, or near Boulder Canyon, in the Lower Basin, and a dam at Topock, in Mojave Canyon, a little over 100 ft. in height would provide this storage and control the floods at much less cost.

"Complete development of water for irrigation purposes would not be needed at the start. Fifteen years, at least, must elapse before the development of all lands requiring irrigation water in the Lower Basin could take place. The total expenditure for providing irrigation water should not be made so far in advance of the development of the lands, because this would entail a terrific waste due to idle capital.

"Electric power development may be augmented beyond that strictly incident to the construction needed for flood control, for the purpose of increasing the revenue, but an initial development beyond 300,000 hp. will result in annual deficits by reason of the lack of an adequate power market to absorb more than this amount of energy.

"An interesting suggestion has been made, that a dam 310 ft. high, near Black Canyon, in the same general vicinity as Boulder Canyon, would sufficiently control the floods with a storage of 4,000,000 acre-ft. of water. At this site 300,000 hp. of electrical energy could be developed at an estimated cost of \$104.30 per horsepower, including the cost of the dam, but without the cost of transmission lines which would raise the figure to about \$145 per horsepower. This low cost compares favorably with the latest development of my own company and is very much less than the \$273 per horsepower cost under the high dam plan for the amount of power the market would absorb without incurring annual deficits.

"At the Diamond Creek site 268,000 hp. could be developed at a cost of \$112 per horsepower, without transmission, and the necessary storage for flood control might be provided at Topock, in Mojave Canyon, for about one-tenth the appropriation asked for in the pending bill. This reservoir would provide secondary power to supplement the output of power plants located higher up on the river. When additional reservoirs are built above Mojave Canyon, this Mojave Canyon reservoir could deliver continuous power while acting as a re-regulating reservoir.

"The greatest benefit to the country will be attained by the development of the whole river, under a comprehensive, co-ordinated plan without waste or conflict. If the government will move along the flood-control question, the people in our own territory and the investors throughout the country are ready to finance the power development through the purchase of taxable securities of our own and other public partnership power companies. The United States would supervise, and the state commissions would regulate, our activities. Over 3,000,000 hp. could be developed on the Colorado River from Lee's Ferry to the Gulf of California without touching the Grand Canyon National Park. About \$1,000,000 a year would be the taxes payable to the states, and an equal amount to the United States, by power companies and their security holders as a result of the first 300,000-hp. development. Complete development would increase these tax payments to about \$18,000,000 annually."

The Lighting Service Bureau, of Salt Lake City, Utah, which was organized about a year ago, is now operating as a definite department of the Rocky Mountain Electrical Cooperative League. The work of the bureau has increased very rapidly since its organization, and some remarkable results have been accomplished. The change is made in order to provide better working facilities and to make still broader the scope of its field of usefulness.

Diamond Drill Work Completed on Deschutes River Site

The Columbia Valley Power Company has completed diamond drill borings at one of the two sites for dams and power houses to be built on the Deschutes River, according to F. R. Schank, consulting engineer of the company. These borings provide the first accurate information as to formations below the surface. As a result of these borings state geologists are now making a complete survey of the formations in that immediate district. The company will cooperate with the state in completing the investigation.

The Columbia Valley Power Company has taken over from the Oregon Trunk road twelve miles of right-of-way recently abandoned between Metolius and the Pelton dam site. The project will include a dam and power house at the junction of the Deschutes and Crooked Rivers and another unit at Pelton, eight miles north of the first site. The two sites, it is estimated, will yield a constant total capacity of 175,000 hp.

The project has been fully financed and active construction work is to be undertaken in the near future, according to Mr. Schank. It is reported that additional sites being investigated will be capable of supplying at least that much more power. Other known power possibilities within the range of the development being made by the company will bring the total potential power of this portion of the Deschutes River and its tributaries to more than 500,000 hp.

The two sites to be developed have the unique advantage, as compared with most hydroelectric projects, of having transportation facilities already provided immediately contiguous, as at the Pelton site, or within a few miles over a first class highway, as at the Metolius site.

The Board of Supervisors of San Francisco, Calif., has approved the appointment of John J. Dailey, assistant city attorney, as special counsel for the city in connection with the valuation of the properties of the Pacific Gas and Electric Company and the Great Western Power Company. The appointment carries with it an increase in salary from \$350 to \$850 a month.

The United States Bureau of Reclamation has advised the Federal Power Commission that it has no further objection to the issuance of a preliminary permit to the Idaho Power Company for its proposed development at Twin Falls, Idaho. In view of this report, it is expected that the Commission will grant the application at its next meeting.

Secretary Work Presents Report on Swing-Johnson Bill

That the generation of electric power by the government is a precarious financial practice, is the opinion of Secretary of the Interior Work as presented in a report on the Swing-Johnson bill sent to the chairmen of the Senate and House committees on irrigation and reclamation of arid lands. Secretary Work at the same time recommended that action as to what should be done in connection with the Colorado River should be governed by what would be best 50 or 100 years hence. The Secretary urged that Congress in its final decision upon a plan of development for the river consider all the separate features in the light of the report, including flood control, impounding water for farming, storing water for generating electric power, the projected all-American canal and the possible future necessity for domestic water to supply California cities.

Secretary Work expressed doubt as to the wisdom of the government's consenting to the erection by either private or governmental bodies of any storage dam in the Colorado until the Colorado River Compact has been signed by Arizona. The total cost of the Boulder Canyon Dam, the power plant, transmission lines and the all-American canal should be set at \$200,000,000, according to the report. This sum includes a margin of safety to protect the government. It is estimated that a dam to raise the water surface 605 ft. and to create a reservoir 120 miles long and 157 acres in area, would cost \$50,000,000. The cost of the all-American canal is set at \$31,000,000.

In regard to the government generation of electric power Secretary Work said:

"The generation of electric power by the government under any conditions is precarious financial practice. The manufacture of it primarily for sale on the open market, in competition, invites subsidies and is without congressional sanction at this time. The government, instead, may exercise its authority to fix rates to consumers for their protection."

Secretary Work's report was accompanied by findings and conclusions of the select board recently appointed and composed of engineers from the Reclamation Service, the War Department, the Geological Survey and the Federal Power Commission. Detailed technical observations on the problems of the Colorado River question were also submitted with the report.

Municipal Light Plant Is to Be Built by Loveland, Colo.

The city council of Loveland, Colo., has signed a contract authorizing the construction of a municipal lighting plant to be in operation by Oct. 18, 1924. The contract was awarded to the Hendrie & Bolthoff Manufacturing & Supply Company of Denver. The company, in its bid, agreed to purchase the entire bond issue of the city voted by the council for the new plant and amounting to \$425,000.

The contract price for completion of the hydro plant and a new distributing system amounted to \$371,587.14. The construction company has agreed to pay the city the difference in cash and to

allow a further payment of \$83,000 to the city with which the city may purchase the distributing system of the present privately owned company, provided the system is condemned.

The city of Loveland first began the erection of a municipal plant in 1917 and work was stopped by a temporary injunction secured by the Denver Gas & Electric Light Company, predecessors of the Public Service Company of Colorado, operating in the northern Colorado field. Later the State Supreme Court ruled there was nothing to prevent a municipality from erecting its own lighting plant.

Then the Franklin Trust Company of New York, representing a bondholders' protective committee, secured a further restraining order and recently the Public Service Company filed a protest with the state public utilities commission, asserting that the contemplated expenditure by the city was insufficient to erect a plant suitable to the needs of the city and setting forth that adequate service is now being given Loveland by that company.

When the city council met March 18 to open bids on the project, a legal representative of the Public Service Company was present and entered a formal protest against the city's proceeding with the work and also warned the bidders of pending litigation.

The city council has advised the Public Service Company, according to newspaper reports, that it will pay \$83,000 for the present distribution system provided that offer is accepted within thirty days, otherwise the city will proceed to construct its own distribution system as provided in the contract which has been signed with Hendrie & Bolthoff.

On account of the legal aspect of the case and its possible effect on financing the project, it is said that only two bids were submitted, the high one being that of a private contractor. A situation similar to that in Loveland occurred 12 years ago in the neighboring town of Longmont, Colo., where the light plant is operated by the municipality.

In submitting its bid to the Loveland council, the Hendrie & Bolthoff Company was represented by James H. Pershing, a prominent Denver attorney, and C. E. Drennen of its sales staff.

Seattle Company Is to Conduct Range Sales Campaign

Plans have been perfected by the Puget Sound Power & Light Company for an extensive range campaign over a 40-day period starting April 1, 1924. The campaign will be staged in conjunction with the Edison Electric Appliance Company. Hotpoint-Hughes ranges will be featured.

Every district of the company will be covered. Demonstrators and speakers furnished by the manufacturer will be placed in district offices where demonstrations will be given for a certain number of days, the period depending upon the size of district. A large number of salesmen will be used. Advertising will be carried in local papers and special sales letters and literature will be employed.

The Puget Sound Power & Light Company added a total of approximately 1,400 ranges to its lines during 1923. This year an effort will be made to sell approximately 2,500 ranges.

Engineering Foundation to Make Tests on Small Arch Dam

Plans for the construction of a small arch dam that can be used for testing purposes have been made by the committee on arch dam investigation appointed by Engineering Foundation. A site has been selected and a portion of the sum necessary to finance the investigation has been subscribed. It is planned to start construction as soon as the balance of the money can be secured. Subscriptions totaling about \$30,000 have been raised and it is hoped that a total of \$100,000 can be raised for the investigation. An invitation to contribute is being extended to all that are interested in securing more information that would make for reduction in the cost of such structures so far as is consistent with safety.

The site selected for the test dam is on Stevenson Creek, a tributary of the San Joaquin River about 60 miles east of Fresno, Calif. The committee has reported that the site is satisfactory for the following reasons: foundation conditions are excellent; the site is accessible and is located on government ground; water will be available at will for testing purposes; and the reservoir capacity will be so small that in case the structure should fail, life or property would not be jeopardized.

It is planned to build a simple single-center arch dam with a constant upstream radius and a vertical up-stream face. The dam is to be built of thin sections and will be carried, at the first, to a height of 60 ft. Repeated tests under various loads and temperature conditions will be conducted at that height. The reservoir may be kept dry for several months so that temperature changes in dry concrete can be measured.

After all studies and analyses have been made, the structure is to be raised successively in 10-ft. steps with tests at each stage until failure occurs or until the dam reaches the maximum height economical at the site. This height would be 100 ft. or more.

The design of the dam, the tests and compilation of all data will be in the hands of the committee on arch dam investigation of Engineering Foundation. W. A. Brackenridge, senior vice-president, Southern California Edison Company, has been selected by the committee to have charge of receiving and disbursing funds.

Development of the Boulder Canyon Dam project should be by private interests instead of by the government, Major-General George W. Goethals told the irrigation committee of the House of Representatives recently. Private development under the Federal Water Power Act, he stated, would safeguard the government and also insure capital when needed. General Goethals recommended that a rock-fill dam be used instead of a concrete one.

According to reports from Idaho, the water supply in that state is below normal. Light snows in the higher altitudes, lack of rain, and a shortage in the stored water supply will necessitate conservative use of water in order to avoid a serious shortage. One measure of economy suggested is a reduction in the acreage of corn planted.

Construction on Alouette-Stave Project to Be Started

The second portion of the Alouette-Stave development of the British Columbia Electric Railway Company is about to be started. The work will consist of driving a tunnel from Alouette Lake to Stave Lake a distance of 4,000 ft., and the damming up of the lower end of Alouette Lake and thus raising the level of the lake a maximum of 45 ft. At the mouth of the tunnel a power house which will develop 11,500 hp. will be built, using the difference in

fall of 25 in., and other mountain districts reported that fairly heavy snow had fallen.

Snow was reported as having fallen heavily on both the eastern and western slopes of the Sierra. Snow in the higher regions is said to have greatly increased the seasonal run-off from the Hetch Hetchy and Don Pedro watersheds and is expected to increase the water supply available for ranchers in Stanislaus County. The usual amount of water for irrigation purposes was expected at Modesto as a result of the snow and rain. A light snowfall in Oakdale added



Bird's-eye view of the Alouette-Stave development of the British Columbia Electric Railway Company, Vancouver, B. C.

level of the two lakes. This water will be used again in the present Stave Falls plant. This plant is being enlarged by rewinding the present generators and adding an additional unit, bringing the capacity of the plant up from 52,000 hp. to 70,000 hp.

The third part of the scheme is a 96,000-hp. plant at Ruskin, three and a half miles down the Stave River. This will be started before 1926. The whole scheme will cost approximately \$10,000,000. Work on the Alouette project is expected to be under way immediately and be finished by the winter of 1925.

Rain and Snow Increase Water Supply of California

California's rainfall total, which is subnormal for the season, received a welcome addition during the third week in March when rain fell both in the northern and southern parts of the state. In the first storm Los Angeles received .45 of an inch, which was about an average for the county. Orange County varied from .30 of an inch at one point to 1.20 inches at another. Wide variations, ranging from one-fifth of an inch at San Diego to 2.24 inches at Lake Cuyumaca, were also recorded in San Diego County. At Calexico in the Imperial Valley, where it had not rained this year, .05 of an inch of rain fell, but it was reported that the rain was not general throughout the valley. Bishop, Inyo County, reported a snow-

fall of 25 in., and other mountain districts reported that fairly heavy snow had fallen. The supply of irrigation water for that district. Foothill streams in all parts of the state are reported as far below the usual high water line for this season of the year, but heavy snowfalls were reported in the Sierra above Sonora and at Quincy, Plumas County, and a light fall on the Marysville Buttes. Rain at the end of the week added another .45 of an inch to Los Angeles' total. At the same time rain fell liberally in the upper Sacramento Valley and lightly at Sacramento, Stockton, Fresno, San Jose and San Francisco. Eureka received .84 of an inch and San Bernardino reported .60 of an inch and a mountain snowfall of one to three feet.

To Start Construction Work on Sultan River Plant Soon

Construction work on the Sultan River power plant of the Puget Sound Power & Light Company will start in the immediate future, according to an announcement following the issuing of a permit for water appropriation to the company by Marvin Chase, Washington state supervisor of hydraulics. The development will cost about \$600,000 and the power will be used to supply towns in Snohomish County.

The plant will develop approximately 4,000 hp. of electric energy, using the water at 100-ft. head. The water will be diverted from Sultan River to the flumes by a diversion dam 15 ft. high and 200 ft. long.

Diversion of Trinity River Is Recommended by Board

The Trinity River in California should be diverted into the Sacramento Valley, in the opinion of the California Power Board. This board was created at the instance of the Federal Power Commission. Its membership is made up of D. C. Henny, Reclamation Service; Major U. S. Grant, 3rd., Corps of Engineers; E. W. Kramer, Forest Service, and W. F. McClure, state engineer of California.

The report finds that the point of diversion should be just below the mouth of Stuart's Fork. The reasons against the diversion, the report says, are outweighed by the advantages for it. It is pointed out, however, that the present demand for power and for irrigation is not sufficient to justify the diversion at this time.

The immediate diversion of the stream is proposed in an application for preliminary permit which has been submitted to the Federal Power Commission by W. H. Samson, of Corning, Calif. In view of the report, it is probable that the Samson application will be denied and that both the state and the federal government will adopt a policy of granting no rights on the Trinity, or on the Klamath below the mouth of the Trinity, which would block the future diversion of the Trinity into the Sacramento Valley.

Consideration Given to New Type Fishways for High Dams

Apparently, means have been found whereby one of the serious problems facing the construction of a dam on the Columbia River at Priest Rapids can be overcome. The proposed dam would cut off salmon from extensive spawning ground. The license for the project will require the construction of a fishway. The Bureau of Fisheries heretofore has taken the position that fish will not cross a dam over 30 ft. in height, regardless of what may be provided to facilitate their passage. That Bureau, however, is about to revise its opinion, it is understood, as a result of experiments in California where large numbers of fish have crossed dams of greater height. This has been made possible by providing a series of resting pools.

H. J. Pierce, the president of the Washington Irrigation & Development Company, which is an applicant for a license covering the Priest Rapids project, visited officials in Washington recently with photographs showing salmon going through such a fishway.

It is believed that this improved method of constructing fishways is of great significance to the power industry on the Pacific Coast and in Alaska. There are many important rivers on which power dams are being strenuously opposed by those interested in the fish industry. These streams include the Klamath, the Sacramento and its upper tributaries, the Columbia and numerous smaller streams.

The annual report of the Industrial Accident Commission of California for the year 1922-1923 is now off the press and ready for distribution. It contains a resumé of the work accomplished by each division of the Commission during the year. Copies will be sent upon request to the Commission.

New Electrical Code Put in Effect in Portland

Requires Installation of Convenience Outlets and Specifies Standards for Electrical Devices Offered for Sale

New and far-reaching requirements are included in the electrical code that has just been adopted in Portland, Ore., and that became effective March 1, 1924. Included among the important provisions are sections requiring the installation of convenience outlets in living rooms, dining rooms, parlors and kitchens of new homes. Another section requires that all electrical appliances, devices and supplies sold in the city be approved by an existing national organization charged with such work. A third provision sets a standard size for all fixture outlets in concealed work and limits the manner of installation of such outlets.

The new code prescribes that all contractors and dealers be licensed. A board of examiners is set up and examinations are conducted at regular intervals. The fees for securing a license follow:

	Fee for 1st Year	Fee for Renewal
General electrical contractor....	\$50.00	\$25.00
Maintenance	5.00	5.00
Electrical dealer	5.00	5.00
Supervising electrician	1.00	1.00

The maintenance fee is required for establishments that service appliances or devices. An additional fee of \$10 is charged candidates who appear before the board for examination as supervising electricians.

The code sets up a board of appeal before which complaints may be taken for hearing. Board members are appointed by the mayor.

The plan requiring the approval of all appliances, supplies and devices sold or installed in the city is not new. It was tried in Chicago and failed because the code in that city set up a local board from which the necessary approval was to have been secured. In the Portland code "approved" is defined as applying to "materials and appliances which conform to the standards of the Underwriters' Laboratories, or to the specifications and requirements of the United States Bureau of Standards or other similar organization of recognized standing, properly equipped and qualified for experimental testing and service-value determinations through field inspections."

The section of the code governing such appliances follows:

Sec. 702—Materials and Appliances
a. All materials and appliances used in the installations which are covered in this Code shall be approved. (See definition of "approved" Section 601.) It is not the intent of this rule to require that motors, meters, and other devices which are not included in the list of inspected appliances issued by the Underwriters' Laboratories, shall be approved as defined by Section 601; but it is the intent to require that wiring, materials and devices, such as those included in the list of inspected appliances issued by the Underwriters' Laboratories shall be approved.
b. No materials or appliances which do not conform to the provision of paragraph (a) of this section shall be sold or offered for sale, either in person or by agent, clerk or employee. (See also Section 301 (a), paragraph 4.)

In the case of this particular provision, a definite period was allowed for dealers to dispose of material which did not conform to requirements. After that all stock was checked and a warning was issued that dealers failing to comply with this section would be subject to a heavy fine. To date it has resulted in the manufacturers of several

devices applying for approval from one of the organizations set down in the code. It has also done much toward eliminating cheap and unsafe material and appliances from the market. The license fees for dealers are sufficient to employ an inspector to make a check of stocks of all stores handling electrical products.

The section requiring the installation of convenience outlets in certain rooms of new dwellings follows:

Sec. 1803—Wattage Requirements for Residences and Apartments

b. Approved receptacles for attachment plugs, connected directly to the circuit wires by not smaller than No. 14 wire shall be provided in parlors, living rooms, dining rooms and kitchens. A light outlet shall be so placed as to illuminate the front of every furnace or heating boiler. These requirements apply to all buildings which are to be wired for electric light. (It is the purpose of the above rule to prevent as far as possible unlawful and dangerous extensions of flexible cord in order to obtain outlets that are nearly always needed.)

It is believed that the above section will have a far-reaching effect. Some disapproval of its requirements was expressed by contractors when the code was issued but since that time the necessity and value of the provision has been demonstrated to them.

Provisions governing the size of fixture outlets have been recommended by the fixture manufacturers for some time. The provisions in the new code conform to these recommendations. They follow:

Sec. 1102—Installation of Outlet Fittings

b. At fixture outlets in concealed work, boxes and plates shall be installed in the manner prescribed in paragraphs 1 to 3, inclusive, below:

1. At ceiling outlets a 4-in. box at least 1½ in. deep, with drilled and tapped ears, shall be used. At side wall outlets, boxes shall conform to these dimensions and, in addition, shall be provided with plaster covers, having drilled and tapped ears, which will reduce the opening through the plaster to not more than 2 in. horizontally, nor more than 3 in. vertically.

2. For fished work in finished buildings, and also for new work where the construction of the building will not permit 1½-in. deep boxes to be used, outlet plates provided with drilled and tapped ears shall be used.

3. Boxes and plates shall have fixture studs attached, except where receptacles only are to be installed in closets, kitchen center, bath centers, front and rear porch centers, and in garages, basements and similar locations (when not rooms). (All outlets over 5 ft. from the floor shall be classed as fixture outlets.)

The Portland code conforms with the National Electrical Code except that in many cases its provisions are more detailed. Especially is this true in the sections relating to the grounding of circuits. Another section where this is noticeable prescribes the wattage of circuits. An important provision in this section follows:

Sec. 1805—Wattage Permissible on Branch Circuits

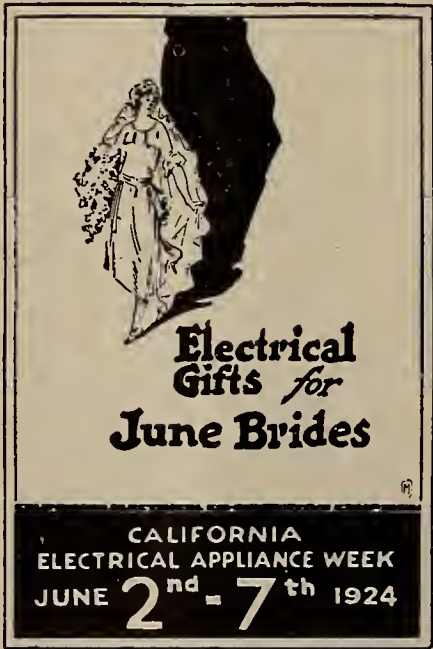
a-3. For portable heating appliances only, in cases where a special circuit of No. 10 wire or larger carried direct into 20-amp. polarized receptacles, an aggregate load of not more than 2,500 watts at 125 volts, or 5,000 watts at 250 volts, will be permitted. Not more than four receptacles and no equipment other than the attachment plug receptacles shall be installed on such circuits; provided, however, that switches and pilot or signal lights may be installed with the individual receptacles if desired. (This rule shall not be construed as authorizing or permitting the installation or use of any individual device consuming more than 10 amp. or 1,250 watts [or in the case of 250-volt circuits, 2,500 watts], on the same branch circuit with any additional load. Each such individual device

consuming over 1,250 watts at 125 volts or 2,500 watts at 250 volts shall be on a separate circuit protected by a separate cutout.)

The new code is largely the work of L. W. Going, head of the electrical division of the bureau of buildings, Portland Department of Public Works. Copies may be secured from that office at 50 cents each, except in the case of electrical contractors and dealers in Portland, who are furnished with two copies free of charge.

Will Repeat Use of June Bride Week Window Material

The designing of the window displays that will be entered in the June Bride Week exhibit contest, June 2-7, will be left entirely to the individual dealers this year, according to the June Bride Week committee of the California Electrical Cooperative Campaign. In past years it has been the practice to suggest a plan that could be followed in decorating the windows.



The card reproduced above will be used again this year to advertise June Bride Week.

The same window trim material will be supplied to dealers this year as was used last year, the purpose being to get the public to realize that June Bride Week is an annual affair. Slogans and the cards that carry the picture of the June bride will present the same message to the public, the only difference being that dates will be changed to read "California Electrical Appliance Week, June 2-7, 1924." The five slogan banners will present the following statements: "Gifts that endure," "Combine beauty and comfort," "For her future happiness," "For her convenience," and "For modern homes."

The decision that the committee would suggest no plan for decorating the dealers' windows was reached after it was agreed that window displays that expressed the individuality of the dealers were of more value than those that all followed one plan. In this connection it was pointed out that each dealer faced a different problem and consequently would desire to use a different type of display to attract customers to his store during June Bride Week.

Gorge Plant on Seattle's Skagit Project Nears Completion

The present status and the cost of the work of the Gorge Creek plant of the Skagit project, Seattle's municipal hydroelectric venture, was recently reviewed by C. F. Uhden, chief engineer of the project, in a statement from which the following has been extracted.

Delay in completing the tunnel contract has postponed the date on which the Gorge Creek plant can be put in service; this date is now set at June 1. Owing to the possibility of high water in the Skagit River, it may be that the timber crib diversion dam, which has been partially built, cannot be finished by that time. However, this will not prevent operation of the plant, for at high water the inlet to the tunnel is submerged, and during the low water season a rock and gravel fill can be thrown across the river to divert its flow into the tunnel. The transmission line was to be completed March 15 and the north substation in Seattle by May 1.

Based on average flow of the Skagit River, the minimum production of the Gorge plant with crib dam will be 23,400 hp., and the maximum 59,000 hp. Mr. Uhden points out that practically all the power from the Gorge Creek plant as now being completed has been sold, and suggests that it is time to start construction of the 240-ft. masonry dam and to install an additional generating unit. With the Gorge Dam built and three generating units installed, the rated capacity of the plant would be 112,500 hp.

The total cost of Gorge Creek plant, including first generating unit, railroad, transmission line, right-of-way and north substation will come within the \$11,000,000 bond issue. No funds are available for additional substations or for construction of any distribution system, but a large part of the Gorge current can be handled by the present distribution system. The estimated cost per hp. of the first installation is \$183, based on the cost of the plant, transmission line, right-of-way, railroad from Rockport to Gorge, and north substation in Seattle.

Extensive Developments Planned by Pueblo Companies

The Southern Colorado Power Company and the Colorado Fuel & Iron Company of Pueblo, Colo., have recently announced improvement programs that will call for the expenditure of several million dollars. The former company will spend over \$400,000, according to W. F. Raber, general manager.

Improvements totaling \$3,000,000 have been approved by the directors of the steel mills and most of this outlay will be for electrical material or boiler house equipment for increased generating facilities. Engineers have been working over two years on these plans and the electrical industry of the mountain region has been anxiously awaiting their completion.

Principal improvements contemplated include the following: electrical precipitators for cleaning blast furnace gas, thereby enhancing the value of these gases as fuel; a new power plant, including a battery of high pressure boilers and stokers with superheaters;

turbo-blowers for the blast furnaces, in place of the reciprocating engines now used for that purpose; additional generating facilities with turbo-generators; and the substitution of electrical drives in the rolling mills replacing the steam engines now employed.

Greater efficiency and increased output is expected as a result of these improvements which have been made necessary as the result of increasing orders for steel. One order already received from the Santa Fe railroad provides for the delivery during 1924 of rails valued at \$5,000,000.

Contracts for the new improvements and equipment will be let this spring, although there are still a number of engineering details to be worked out, according to company officials.

The Southern Colorado Power Company will spend one-quarter of its appropriation for repairs and improvements of distributing facilities. The line between Pueblo and Stone City will be reconstructed, also the lines in the Cripple Creek region, due to the increasing number of old mines that are being electrified. Changes will also be made in the system at La Junta, Rocky Ford, and Sugar City.

Improvements at the Canon City steam plant are already under way. New boilers will be installed increasing the generating capacity about 25 per cent.

Transformer capacity at the Pueblo steam generating station will be increased by 4,000 hp. in order to increase the exchange of power between the principal plants. Expense in making these improvements at Pueblo does not include any changes necessitated by the establishment of the Pueblo flood conservancy district.

New display windows are to be installed by the Western Public Service Company in its office at Laramie, Wyo. Plans are now being made by M. H. Soule, manager of the Laramie office, for a lighting installation that will be without a peer in southern Wyoming.

The City of Eugene, Ore., has recently applied to the office of Rhea Luper, state engineer, for a permit to appropriate 2,500 sec.-ft. and 5,000 sec.-ft. of water from the McKenzie River. The water is to be used for power developments at two locations.

Tariff Supplement Is Filed by Grays Harbor Company

Tariff supplement has been filed by Grays Harbor Railway & Light Company, Aberdeen, Wash., with the state department of public works in Olympia, Wash., effecting a reduction for the smaller consumers. The new schedule is applicable to Aberdeen, Hoquiam and Cosmopolis for single phase a.c. residential and commercial lighting service and small power installations of less than 5 hp.

The rate schedule provides a 9-cent rate per kw-hr. for the first 20 kw-hr.; 8 cents for the next 80; 7 cents for the next 100; 5 cents for the next 100 and 4½ cents for all over 400 kw-hr. The old rate was 10 cents on the first 40 kw-hr.; 9 cents on the next 30; 7 cents on the next 100; 6 cents on the next 100; 5 cents the next 100 and 4½ cents on all over 400. The new filing will be effective April 1.

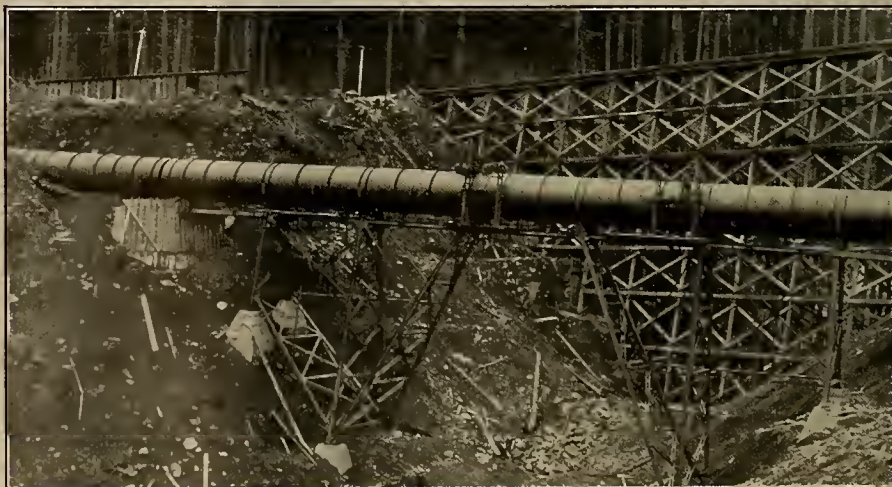
Progress Reported on Oak Grove Plant Construction

Rapid strides are being made in the construction of the first unit of the Oak Grove plant of the Portland Railway, Light & Power Company on the Clackamas River in Oregon. Present plans call for the completion of the 25,000-kw. unit July 1, 1924.

A summary of the progress report of March 15 showed all steel to be on the ground with the exception of the manifolds. The pipeline will be completed April 1 and concreting of Tunnels Nos. 1 and 2 will start on that date. The diversion dam and the intake structure with the exception of the intake gates have been completed. The penstock is 50 per cent complete.

Forms have been removed from the power house and practically all concrete work finished. The Pelton water wheel is being set and parts of the generator began arriving March 15. The crane has been installed. Both Pelton and General Electric Company engineers are on the ground to supervise the installation of equipment furnished by those companies.

The transmission line has been completed for some time and at present is being used for the purpose of supplying energy for construction work.



Portion of Canyon Creek pipeline recently installed to carry water to the Oak Grove Power House of the Portland Railway, Light & Power Company.

Electric Smelter Proposed for Colorado School of Mines

With the recent announcement that a demonstration unit of the first electric smelter in Colorado would shortly be installed by private parties, the metal mining industry in that state has suggested the advisability of placing such a unit in the experimental plant of the Colorado School of Mines. Robert H. Sayre, one of the trustees of the institution and a well known figure in the mining industry of the mountain region, has already suggested such a plan of action to Governor William E. Sweet, according to recent newspaper dispatches.

The experimental plant which was recently reopened after a shut-down since the war, is now under the direction of A. J. Weinig and S. Power Warren, metallurgists of national reputation who have had considerable experience in electro-smelting experimentation. John Joyce, state commissioner of mines, has added his recommendation to the plan.

Stewart Electric Manufacturing Buys Safety Electric

The Stewart Electrical Manufacturing Company, San Francisco, Calif., has purchased the stock and business of the Safety Electric Company, that city, and will in the future be located at the latter's plant, 59 Columbia Square, San Francisco. The company will continue to manufacture switches, switchboards and other similar lines. J. T. Stewart and E. W. Lange are the proprietors of the Stewart Electrical Manufacturing Company and they have retained in their employ L. J. Van Atta and the sales and engineering forces of the Safety company.

Seattle Will Try Experiment to Prevent Electrolysis

Supt. George F. Russell of the Seattle Water Department has requested an appropriation of \$2,582.62, one-half each from the Water and Municipal Railway Departments, to install a negative feeder from the James Street substation to the new steel pipe line from Cedar Lake, to prevent damage to the line from electrolysis. The experiment is planned to prevent disintegration of the steel from stray current from the municipal railway lines. Superintendent Russell points out that if successful, the negative feeder would return the stray power to the railway and reduce its power loss.

H. V. Gates of Terrebonne, Ore., has applied to the office of Rhea Luper, Oregon state engineer, for permission to appropriate water from Crooked River, in Jefferson County. Mr. Gates proposes to develop approximately 7,950 hp. of electrical energy for commercial uses in that county.

The Commissioner of Light and Water of Tacoma, Wash., has announced that bids will be received until April 16, for equipment for the Lake Cushman power project of that city. The most important items included in the call for bids are: two 27,500-hp. vertical turbines, for an operating head of from 140 to 250 ft., together with auxiliary equipment; two 20,000-kva. vertical type gen-

erators, with auxiliaries; seven 6,667-kva., four 14,100-kva. and ten small transformers; and one 15,000-kva. synchronous condenser, with auxiliaries.

Approximately 175 acres of land along the Pit River have been transferred by the Pacific Gas and Electric Company of San Francisco to the State of California. The land adjoins the Burney Falls State Park in Shasta County and will give that park a frontage on the lake that will be formed upon the completion of the 125-ft. dam being built to impound the waters of the Pit River for the Pit No. 3 power plant.

Proposals to change the name of the Portland (Ore.) Railway, Light & Power Company, to Portland Electric Power Company, were presented at the annual meeting of the board of directors of the company on March 26. No definite action was taken at the meeting. The reason for considering the change in name is given that at the time of the company's organization in 1907 its street railway business comprised the principal activities. The condition is now reversed, the light and power business having taken the lead. A stockholders' meeting will be held April 4, at which time the change in name may be reconsidered.

Books and Bulletins

McGraw-Hill Books

McGraw-Hill Book Co., Inc., Penn Terminal Bldg., New York City. Distributed free on application.

Perhaps it may seem somewhat of a task to write a review of a catalog, for that is what McGraw-Hill Books is. Nevertheless this is more than a mere catalog in the ordinary acceptance of the term. It is a book about books, many books, useful books, and, if intelligently used will probably be the book most referred to of any in the library of the engineer, technician, or librarian.

The sum total of human knowledge is becoming so great, and writers so many and prolific, that it is a gigantic task to know where to look when the need for specific information on any subject is manifest. Here, then, is a catalog of the publications put out by one of the world's great technical publishing houses, so, in this respect at least, that problem is automatically solved.

There is first the index, or rather the indices. There are three, a classified table of contents, an author's index and a subject index, three ways by which the searcher may locate what he wants. The detail is also carefully worked out. Books are classified under general captions which are more specific than usual. In the description of each book is given a condensed summary plus a statement of chapter captions. This will be most useful in facilitating the selection of the right book to suit the purpose. The general captions themselves are arranged alphabetically, thus constituting actually a fourth index, which in turn is cross-indexed. Nearly two thousand volumes are included.

It is a big job to work out a catalog of this nature, and the publishers have done a useful and excellent work that will be appreciated by everybody that is anybody in engineering and industrial pursuits.

THE SELLING PROCESS

By NORVAL A. HAWKINS, formerly general sales manager, Ford Motor Company, Detroit, Mich. 314 pages. \$3.00. Norval A. Hawkins, Detroit, Mich.

CERTAIN SUCCESS

By NORVAL A. HAWKINS. 382 pages. \$3.50. Norval A. Hawkins, Detroit, Mich.

These are companion books and should be found together in the library of every business man, whether he be directly connected with sales or engaged in executive or administrative work. The first book is in its sixth edition and thirty-fourth thousand. The second book, written some time after its predecessor, is already in its third edition. These books constitute an unusual and analytical review of the handling of sales and sales work. The author has considered in detail the various steps in a sale and has presented his analysis in clear-cut fashion and in phrases so simple they must be understood by all. No salesman can read these books without absorbing involuntarily so much of personal benefit that his work will unconsciously be improved. The reward for his reading should be written in more intelligent effort and increased sales volume.

Sales managers should read these books in order to present more clearly to their men the fundamentals of good selling and the importance of the personal equation in sales work. Executives will find much of real value in each volume and will be able better to analyze their employees and to place them to the best advantage to their general organizations.

The author has presented his material in unusually readable form and has introduced none of the trite expressions of ordinary sales texts. His experience and his keen knowledge of sales development, as well as of the development of the individual, stand out sharply in every chapter. He has produced books that should become standard texts in every course in salesmanship and that should be in the possession of every salesman, no matter what his ability or his experience. The material is presented with a punch in every sentence—no one but a dullard can fail to get his story. The simple English, the straightforward method of presentation and the style of treatment of the subject make these books unusually interesting reading.

The "Electrician" Electrical Trades Directory and Handbook for 1924, Benn Bros., Ltd., London, Eng., has just been issued. This is the yearly edition of what is more familiarly known as the "Blue Book" and is replete with useful information. In addition to valuable technical data the book contains a roster of names prominent in the electrical industry in England and the British colonies and also contains much useful miscellaneous information. A particularly popular section of the book is the classified directory of manufacturers which directory is unusually complete in its scope. The price of this book is 25 shillings, net.

Meetings

Electric Club of San Diego to Hold Picnic in May

Finding that the holding of one meeting each month at which ladies are guests of honor, is a successful practice in many respects, a picnic is being arranged for the open meeting of the Electric Club of San Diego, Calif., to be held in May. Bruno Barth has been appointed to head the picnic committee, on which are also W. W. Gibson, Fred Goss, Chris Goldkamp and G. W. McLeod.

The last social meeting of the San Diego club, March 11, was under the auspices of the Better Street Railway Cooperation committee, of which Fay Smalley was chairman. The street-railway company was host to the electric men and their wives for a special car ride over one of the new lines of the San Diego Electric Railway Company.

After the car ride a banquet was held in the San Diego Hotel. Short talks were made by Claus Spreckels, vice-president and general manager of the street railway, M. J. Perrin, assistant to the general manager, L. J. Burns, assistant general manager, city councilmen and guests.

Under the auspices of the Public Education committee, the March 18 meeting was featured by an address by W. A. Hamman, instructor of public speaking at the San Diego high school.

Physicist Addresses Meeting of Portland Engineers

A short description of some of the work now going on at the Schenectady plant of the General Electric Company was made at the March 12 meeting of the Portland sections of the American Institute of Electrical Engineers and the National Electric Light Association, by R. R. Robley, operating engineer of the Portland Railway, Light & Power Company, who has just spent six months in the central station engineering department there.

Prof. A. A. Knowlton, of the physics department of Reed College, made the principal address and spoke on the structure of the atom. He explained the various steps that led the physicist to his present conclusions and demonstrated several of his points with special apparatus. A film, "Beyond the Microscope," assisted in the presentation.

Public Relations Committee Report Is Completed

The public relations committee of the commercial section, Pacific Coast Electrical Association, met at the Jonathan Club in Los Angeles, Calif., on March 15. The meeting was presided over by the chairman, R. E. Smith, advertising agent of the Southern California Edison Company, Los Angeles, and was attended by Don C. Ray, manager, bureau of public relations, Pacific Gas and Electric Company, San Francisco; R. A. Balzari, manager, industrial depart-

ment, Westinghouse Electric & Manufacturing Company, San Francisco; A. E. Holloway, superintendent, commercial department, San Diego Consolidated Gas & Electric Company, San Diego; George T. Bigelow, assistant general agent, Southern Sierras Power Company, Riverside; A. M. Frost, manager, commercial department, San Joaquin Light & Power Corporation, Fresno; and W. H. Fischer, manager, department of greater service, Southern California Edison Company, Los Angeles.

Among the various matters discussed was the final report of the committee for presentation at the convention of

COMING EVENTS

National Safety Council—Engineering Section—
San Francisco, Calif.
April 7-8, 1924

Engineers' Society of Pasadena—
Pasadena, Calif.
April 10, 1924

Wyoming Utility Association—
Annual Convention—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Division, National Electric Light Association—
Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

Rocky Mountain Committee on Public Information—
Quarterly Meeting—Cheyenne, Wyo.
May 5-6, 1924

National Electric Light Association—
Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—
Absecon, N. J.
May 26-29, 1924

American Association of Engineers—
San Francisco, Calif.
June 11-13, 1924

Pacific Coast Electrical Supply Jobbers' Association—
Quarterly Meeting—Coronado, Calif.
June 12-14, 1924

Pacific Coast Electrical Association—
Annual Meeting—Coronado, Calif.
June 16-20, 1924

the association to be held at Coronado in June. The reports of the sub-committees, including that covering the "Smiles" campaign, were considered and incorporated into the general report.

To Display Third Electric Home in Salt Lake City

Plans are now under way for the third electric home in Salt Lake City. The electric home committee of the Rocky Mountain Electrical Cooperative League has the matter in hand. The home is to be built at the corner of Yale Avenue and 15th East Street, one of the most attractive of the city's residential sections.

E. H. Eardley, chairman, will have charge of the home management, more particularly the display arrangements. G. R. Randall will have charge of all of the League's portion of the mechanical and electrical work, as well as supervision and direction of the electrical installations. L. B. Johnson will direct the publicity. E. A. Evans, secretary of the committee, will have under his supervision the exhibits which are separate and apart from the home.

Educational Entertainment Will Be Presented in Denver

For the benefit of its members and their families, including employees, an entertainment has been arranged by the Electrical Cooperative League of Denver, Colo., for April 4 which promises, according to reports, to be a combination of education and good time. Two sets of moving pictures, the Westinghouse Lamp Company film "Show 'Em How" and the General Electric Company's latest film, "Wireless Wizardry," with special musical numbers will be presented.

A one-act musical revue with a chorus of sixteen telephone girls from the Denver exchange will be offered by the Mountain States Telephone & Telegraph Company through Dean Clark, commercial manager, and treasurer of the Denver league. An exhibition by the company's champion first aid team will also be featured.

The double quartet of the Public Service Company of Colorado is billed for several numbers. A number of other features are being arranged by the league's entertainment committee consisting of J. C. Davidson, chairman, C. E. Addie, R. W. Elliott, W. E. Barrett, E. A. Scott and E. E. Stettler.

League Asks Separation of Hetch Hetchy Issues at Polls

By resolution adopted at a meeting of its board of governors on March 18, the Civic League of Improvement Clubs and Associations of San Francisco, Calif., requested the Board of Supervisors to separate completely "the proposals for bonds for the Hetch Hetchy water system and for the municipal hydroelectric distributing system, respectively."

Two ordinances passed by the board authorized a bond issue for the continuance and completion of the work on the Hetch Hetchy water system as well as an issue for the construction and acquisition of a municipal hydroelectric power distributing system. The election is scheduled for Sept. 2, 1924, at which time, under the ordinances as passed, the two questions would be submitted to the voters as one issue. The Civic League took the stand that their presentation as separate and distinct issues would enable the people of San Francisco to express themselves definitely on each point.

The resolution also contained a request that the board provide for a stipulation "that the sums of money to be thus authorized for the completion of the Hetch Hetchy water system and for the hydroelectric power distribution system, respectively, be expended only for their respective purposes and none other, and that under no consideration shall such sums or any portion thereof be used for any purpose other than thus stipulated in such bond issues."

The California Development Association has requested business men of the state to subscribe \$100,000 for the purpose of completing the survey of the water resources of California. The request announces that the \$200,000 appropriated by the state has been exhausted and that if the additional \$100,000 is secured the state engineer states that the survey can be completed and findings submitted to the legislature in January, 1925.

Manufacturer, Dealer and Jobber Activities

Curtis Lighting, Inc., is now located in its new quarters at 1119 West Jackson Boulevard, Chicago, Ill.

The National Lamp Works of the General Electric Company, Cleveland, Ohio, has announced that the prices on National Mazda lamps have been reduced in common with all other Mazda brands.

The McGill Manufacturing Company, Valparaiso, Ind., is now represented in New York by the McGill Manufacturing Company, 67 Park Place, New York City.

The E. H. Freeman Electric Company, Trenton, N. J., has just issued Catalog No. 8, showing the complete line of Circular F wiring devices. This catalog contains 64 pages and gives illustration and data on each article manufactured by the company.

The General Electric Company has recently put on the market an electrically operated flow meter which is designed to provide an accurate means of measuring the total flow of gas, oil, steam, etc., through pipes. Due to the electrical principle of operation, the indicating, curve-drawing and integrating instruments can be located any distance away from the pipe where the flow is being metered. Instruments can be either separated, grouped or arranged as requirements dictate.

The Johnson Electric Washing Machine Company, Berkeley, Calif., has opened a new store at 1696 Fillmore Street, San Francisco. I. H. McCarthy is the manager.

N. Steinberg, until recently service manager of the San Francisco, Calif., office of the Hoover Company, has opened a new store at 1344 Fillmore Street, that city, where he will do a general retail business in electric appliances.

The Peerless Light Company, Chicago, Ill., has just placed on the market two new styles of bungalow ceiling fixture. These are furnished in two, three and four lights in ivory finish and are popularly priced.

The Stuart Products Corporation has just put on the market a new B battery designed for the new style upright radio cabinets. The battery can be placed in the rear of the cabinet.

Crouse-Hinds Company, Syracuse, N. Y., has issued an attractive folder descriptive of condulets for switch and plug receptacle outlets. In addition to showing illustrations of the devices this folder also shows photographic reproduction of installations.

The Robbins & Myers Company, Springfield, Ohio, has issued a new catalog on types R and RA repulsion induction motors. The bulletin—No. 137—will be furnished on request to the factory.

The Benjamin Electric Manufacturing Company, Chicago, Ill., has issued Bulletin No. 52 which contains a great deal of useful information on lighting equipment, reflectors, fittings, etc., and in addition has considerable technical data presented in convenient form.

The Packard Electric Company, Warren, Ohio, has begun manufacturing in its new plant, just recently completed. This plant, it is said, will greatly increase the production facilities of the company.

The F. W. Wakefield Company, Vermillion, Ohio, has issued a new folder descriptive of "Red Spot" fixture hangers and containing a copy of the Wakefield specification for the guidance of buyers.

The Westinghouse Electric & Manufacturing Company has just published an eight-page circular—C 1694—descriptive of "Supervisory Control." The circular contains a discussion of the general principles of both audible and visual systems of supervisory control for automatic substations. The circular will be sent upon request to the factory.

The Medearis Electric is the new name for the firm formerly doing business under the style of Ell-Bee Appliance Company, at 810 American Avenue, Long Beach, Calif. No change in the personnel is recorded, B. O. Medearis and G. B. M. Medearis retaining ownership.

The Majestic Electric Appliance Company, Inc., San Francisco, Calif., has just issued a new catalog descriptive of its new line of heavy duty air heaters. This catalog is well illustrated in color and contains, in addition to the descriptive matter, installation diagrams and a chart showing the cost of operation per hour of various sizes of heaters at full, medium and low heat, based on current costing 2 cents, 1½ cents and 1 cent per kw-hr.

W. N. Mathews Corporation, St. Louis, Mo., has announced a reduction in the prices of OK and open type Mathews Fuswitches. The reduction is effective March 1.

The Moore Steam Turbine Corporation, Wellsville, N. Y., has brought out a new type of centrifugal pump. The pump is said to embody several novel construction features.

The Ohio Electric & Controller Company, Cleveland, Ohio, has brought out a new motor-generator for charging three-cell radio or automobile storage batteries.

The Illinois Wire & Cable Company, Sycamore, Ill., has purchased six acres of land in Oakland, Calif., where it has started the construction of a modern wire mill. This plant is expected to be in operation within ninety days and will be used to supply the company's customers in the West.

The H. G. Weeks Manufacturing Company, Hamilton, Ohio, has moved to new and larger quarters in that city.

The Packard Electric Company, Warren, Ohio, has issued Bulletin 202-A, which is devoted to the presentation of information regarding A-W regulators for control of series street lighting circuits. The bulletin also contains price lists on the equipment. It may be secured by addressing the manufacturer.

R. E. Grimes and F. J. Reeves, formerly of Stewart Electrical Manufacturing Company, San Francisco, Calif., have organized the Electric Sheet Metal Works, at 752 Bryant Street, San Francisco, where they will do a general sheet metal working business particularly for electrical purposes.

Landers, Frary & Clark, New Britain, Conn., have recently put on the market the Universal electric cooker. The cooker is provided with special kettles and a cover and will roast, bake and broil as well as care for surface cooking. The device is rated at 660 watts and is controlled by means of a three-heat switch. It is supplied with 24 pieces of aluminum ware.

Simplex Electric Heating Company, Cambridge, Mass., has brought out a new electric iron in which the Simplex nichrome, enclosed-coil heating element is used. One of the features of this iron is the new "Simplex Unbreakable All-Steel Plug." It is claimed that this plug cannot chip, crack, crumble or break. A Bakelite ball grip on the anti-kink spring provides a convenient means of connecting and disconnecting the iron. Another interesting feature claimed for the ball grip is that it, in combination with the spring which connects it to the plug, assures a quick break of the circuit when detaching the iron. This eliminates excessive arcing.



Travelers always attract attention, particularly when they have a new idea to present. Maybe that is the reason that B. J. Meyers, in charge of the Peerless Sales Palace of the Peerless Light Company, got these three men to pose for his camera at Monrovia, Calif. The southern California men are: (from left to right) Thomas Statler, salesman, San Francisco branch of Peerless Light Company; and Messrs. Winder and Jones of the electrical firm of the same name.

Personals

A. B. Day, who has been in the employ of the Los Angeles Gas & Electric Corporation for the past thirty years, was recently elected to the position of vice-president and general manager of that organization. Mr. Day, immediately after his graduation from Los Angeles High School, 30 years ago, joined the Los Angeles Gas & Electric Cor-



A. B. DAY

poration as a salesman in the gas stove department, later becoming bookkeeper of the consumers' ledger, when there were less consumers on the books than there are now consumers every month at the present time. His next position was chief clerk of the gas office, acting as paymaster in addition to his other duties. He then became chief clerk of the electric office, then manager of the gas appliance department. His next promotion, which was about twelve years ago, was to the position of assistant to vice-president, then he was promoted to be auditor and, in turn, to the positions of assistant secretary, manager of operations, assistant general superintendent and general superintendent, acting in this last capacity for the past three years. From this position he was elected to the active head of the corporation which he has served in various capacities. Mr. Day succeeded William Baurhyte, who was elected president of the organization in place of W. B. Cline, who is now chairman of the board of directors. Mr. Day's place as general superintendent has not been filled up to the present time.

C. C. Hillis, president and general manager of the Electric Appliance Company, San Francisco, Calif., is on an extended trip to Eastern points. During his absence Mr. Hillis will visit, among other places, New Orleans, La., New York City, New Britain, Conn., and Providence, R. I.

G. M. Simonson, for the past several years chief electrical engineer of the State of California, has resigned to enter private employment. Mr. Simonson has been connected with the division of agriculture, department of public works, for about eleven years.

Frank M. Reeves, for the past four years power engineer of the Western Electric Company, Hawthorne, Ill., has joined the force of the Triumph Electric Company, Cincinnati, Ohio. He will represent the company at its Cincinnati office.

A. B. West, president of the Southern Sierras Power Company, Riverside, Calif., speaking before the House Irrigation Committee recently, recommended that Boulder Canyon dam be constructed immediately by private interests supervised by the Federal Water Power Commission. According to press dispatches, Mr. West stated that in this way the project could be developed to better advantage than if the government handled it, no demands would be made upon the United States Treasury, and the delays and excessive costs usually incident to the construction and operation of publicly owned works would be avoided.

James W. Perry, general manager of the electrical, automotive and public utilities departments of the Johns-Manville Company, New York City, has been elected a vice-president of that company. Mr. Perry is an active member of the American Institute of Electrical Engineers, the American Electric Railway Association and of the National Electric Light Association.

W. C. Mumaw has been appointed development director of the Grays Harbor Light & Power Company, Aberdeen, Wash. Mr. Mumaw, who was formerly manager of the Aberdeen telephone system, will locate new outlets for the power being developed on Grays Harbor, and seek new industries for Grays Harbor cities.

W. A. Brackenridge, senior vice-president of the Southern California Edison Company, Los Angeles, recently spent some time in Seattle conferring with executives of the Puget Sound Power & Light Company.

Norwood W. Brockett, chairman of the Northwest Electric Light and Power Association committee on public relations and tax agent for the Puget Sound Power & Light Company, Seattle, Wash., addressed the Seattle Gyro Club recently on the hydroelectric possibilities of the State of Washington, opposing the Erickson superpower bill. Oliver T. Erickson, author of the bill, will appear before the club shortly.

C. R. Eccles, of the Western States Gas & Electric Company, Stockton, Calif., has been placed in charge of the personnel department recently organized by that company.

R. H. Ballard, vice-president and general manager of the Southern California Edison Company, Los Angeles, Calif., is in Washington, D. C., conferring with government officials relative to the Swing-Johnson bill and to flood control on the Colorado River.

J. D. Ross, superintendent of the Seattle light department, was the principal speaker at the Engineers' Club recently, on the subject of "The Success of Municipal Ownership."

George L. Myers, assistant to the president of the Pacific Power & Light Company, Portland, and president of the Northwest Electric Light and Power Association, has just returned from New York where he attended a meeting of the executive committee of the National Electric Light Association.

Will J. French, former chairman of the Industrial Accident Commission of the State of California, and for thirteen years a member of that body, has resigned to become an executive officer of the California Society for the Blind.

Carl A. Becraft, for the past three years superintendent of the Hardin Electric Light & Power Company, Hardin, Mont., has resigned to become superintendent of utilities at Miles City, Mont. In his new work Mr. Becraft will have charge of the electric, water and heating plants.

A. W. Leonard, president of the Puget Sound Power & Light Company, Seattle, Wash., has been elected president of the Tacoma Railway & Power Company, Tacoma, Wash., and of the Northwest Traction Company. The former company operates the street railway system in Tacoma and the latter operates the interurban line between Mount Vernon, Wash., and Bellingham.

R. S. Beers, engineer of the railway equipment engineering department of the General Electric Company, Schenectady, is making a tour of the Pacific Coast offices of the company. Mr. Beers spent some time in San Francisco late in March and will visit all of the Western offices before returning to his headquarters.

John F. Greenawalt, publicity manager of the Mountain States Telephone & Telegraph Company, Denver, Colo., has just been elected secretary of the Colorado Public Service Association. Mr. Greenawalt was born in Cass County, Mich., where he later taught school for eight years. In 1898 he became owner and editor of the Florence, Colo., Tribune, and after six years of active newspaper work joined the staff of the Colorado Telephone Company. In 1911 he was appointed advertising manager of the Mountain States Telephone & Telegraph Company, which had



JOHN F. GREENAWALT

succeeded the Colorado Telephone Company. He was later made general publicity manager of the company which was by that time operating in Montana, Wyoming, Colorado, New Mexico, western Texas, Arizona, Utah and Idaho. Mr. Greenawalt is a member of the Rocky Mountain Committee on Public Utility Information; of the National Electric Light Association, and of various other civic and commercial organizations, including active membership in practically all of the electrical and utility associations of Denver.

Harry Noack, vice-president of the Pacific States Electric Company, San Francisco, recently completed a tour of inspection of the Pacific Northwest. Mr. Noack visited his company's offices in Portland, Ore., Spokane and Seattle, Wash.

Yasuke Anzo, electrical engineer, and Masagoro Akazawa, chief mechanical engineer, of the Tokyo Electric Light Company, Tokyo, Japan, are visiting the United States in the interests of the rebuilding of the properties destroyed by the recent earthquake in their country. They have spent some time in San Francisco, Calif., and will visit the major developments in California before going East to visit various manufacturers and power developments. Before returning to Japan they will also inspect electrical properties in England, Europe, India and other countries.

Robert Brewster, of the Radio Corporation of America, San Francisco, Calif., spoke before the Oakland Electric Club at the regular weekly luncheon on March 17. Mr. Brewster gave an interesting exposition of the latest developments in radio practice and demonstrated a new type super-heterodyne set.

Theodore Dwight has become associated with the firm of Murray & Flood, engineers, New York City.

C. Louis Collins, of Salt Lake City, Utah, has been appointed field secretary of the Rocky Mountain Electrical Co-operative League. Mr. Collins has had extensive experience along business lines, and has a wide acquaintance among the interests represented by the league. For eleven years, with the exception of one year in military service, he was associated with the Strevell-Paterson Hardware Company, of Salt Lake City, in office and accounting work. During the past five years he has held the position of office manager



C. LOUIS COLLINS

of the Motor Mercantile Company of Salt Lake City. One of Mr. Collins' first activities in his plan of promoting the welfare of the electrical fraternity in this section will be the establishing of an accounting method, based on standard and practical principles, to be adopted by the contractor-dealers. The standard accounting system of the Association of Electragists will undoubtedly be the one to be adopted. Mr. Collins will be in full charge of league affairs under the direction of the board of trustees.

Paul E. White, for some time illumination salesman for the San Francisco district of the Pacific Gas and Electric Company, has been appointed sales engineer in charge of domestic applications, succeeding Oliver E. Sholders, resigned.

John V. Strange, assistant general manager of the Pacific Power & Light Company, Portland, Ore., has just returned from New York where he conferred with executives of the Electric Bond & Share Company, parent organization of the utility with which he is connected.

Ben Ritter and W. E. McCourt topped the list of employees of the Public Service Company of Colorado in Denver in amount of new business developed during December, 1923, in the special and floor representatives group. The figures were recently announced by the new business department of the Doherty utilities. M. G. Wrigley, of the western division of the company at Boulder, was high man in the territorial representatives group.

Allan Bole, president of the National Pole Company, Escanaba, Mich., is in San Francisco on business for his company. Mr. Bole will visit other Pacific Coast cities before returning home.

F. C. Hitchcock, of Hitchcock & Tinkler, engineers, was a recent visitor to San Francisco, Calif., en route to New York City. Mr. Hitchcock is in charge of the construction of the Moffat tunnel through the Continental Divide.

Frederick D. Pratt, formerly president of the Tacoma Railway & Power Company, Tacoma, Wash., and of the Northwest Traction Company, Bellingham, has been succeeded by A. W. Leonard. Mr. Pratt will remain as chairman of the board of directors.

L. B. Gawan, lighting salesman of the Utah Power & Light Company, and prominently identified with the work of the Lighting Service Bureau of Salt Lake City, has been appointed a member of the Lighting Bureau of the Northwest Electric Light & Power Association.

K. E. Van Kuran, Los Angeles district manager of the Westinghouse Electric & Manufacturing Company, has gone to St. Louis, Mo., where he is attending a conference of district managers of the company. He will be away for about three weeks.

C. H. Forsgard, district superintendent of the western division of the Public Service Company of Colorado with headquarters at Boulder, Colo., has been transferred to Durham, N.C., as general manager of the Durham Public Service Company, a Doherty subsidiary. Before his departure for the south early in March, a dinner in his honor was held in Boulder at which representatives from all the Doherty properties in the mountain region were present.

Mrs. Alma E. Hunt, formerly home economist with the Southern Colorado Power Company, made her debut as a special demonstrator for the Edison Electric Appliance Company with the Public Service Company of Colorado in Denver early in March.

H. D. Randall, manager of the Rocky Mountain district of the General Electric Company with headquarters in Denver, Colo., was a visitor in Salt Lake City, Utah, last month. He attended the annual stockholders' meeting of the Capital Electric Company in that city.

Walter Cary, vice-president of the Westinghouse Electric & Manufacturing Company, of East Pittsburgh, Pa., and vice-president and general manager of the Westinghouse Lamp Company, through years of activity in the field of electrical illumination is known to electrical men in all sections of the country. He was born in Milwaukee, Wis., April 26, 1871; was educated at the Milwaukee High School and at Harvard University, from which he was graduated with the degree of A.B. in the class of 1893. Soon after graduation he associated himself with the Gibbs Electric Company of Milwaukee, with which he served as secretary from 1894



WALTER CARY

to 1898. This introduced him to the electrical industry, which he found congenial, and he fitted himself for further progress in it by intensive study of both its technical and administrative principles. Early in 1899, with some other Milwaukeans, he organized the Milwaukee Electric Company for the manufacture of dynamos and motors, becoming its vice-president on organization and its president in 1902. He remained with it as president until 1904, when he was called into service with the Westinghouse Lamp Company, of which he soon became vice-president and general manager. Under his active management this company has attained a high place in the incandescent lighting field. He was made vice-president of the Westinghouse Electric & Manufacturing Company on June 20, 1917, while continuing to hold his position with the lamp company. Mr. Cary has been especially active in the affairs of the Electrical Manufacturers' Club, having served as its secretary for five years, as vice-president for one year, and as president for one year. He is a member of the American Institute of Electrical Engineers and also of the University, Union and Harvard Clubs of New York City.

E. C. Macy, chief engineer for Stone & Webster, Boston, Mass., has recently returned from Japan where he was sent following the earthquake. Mr. Macy states that his company will build a hydroelectric plant costing approximately \$10,000,000 to furnish electricity to the city of Tokyo and the surrounding district.

John Hood, who has recently represented the General Electric Company in Honolulu, has been appointed manager of the Oakland, Calif., works of that company.

Trade Outlook

San Francisco

Trade conditions, in general, are good. Although buying is still moderate, it has been stimulated by the rains that fell during the last week in March. Retail sales are reported normal for this period.

Shipping has increased in volume, resulting in less idleness along the waterfront than is usually existent at this season of the year. In other lines there is no marked degree of unemployment, skilled labor apparently being kept busy at good wages.

Demand for steel products is good, and the output is close to the record set last spring. Deliveries on electrical equipment are fairly good, although slow on some lines.

Money is free, with interest rates low, particularly on call money. Collections, which have been somewhat slow, are reported as showing improvement, and this of course tends to improve the credit situation.

Building continues at a brisk pace. Manufacturing companies are fairly active, the cracker and biscuit business particularly showing a steady growth. Milling companies are producing flour at a higher rate than last year.

Seattle

Passing the banner war boom year of 1920 by a good margin, and beating the 1923 record by more than 15 per cent, Seattle's bank clearings in February reached the total of \$159,662,545, representing an increase of \$28,000,000 over February of last year. Bankers state the showing made by these figures indicates the constantly growing tide of retail business, industrial progress, commerce and building activities.

The week just past has been the most active in residence construction for many months past, and indicates that spring house-building has begun in earnest.

Volume of sales of electrical merchandise is reported satisfactory by Seattle jobbers and dealers. Movement of household appliances and house-wiring devices is said to be particularly active, while the better class of fixtures is increasingly in demand. Prices, on the whole, show no important changes. Stocks are now in good condition, and shipments from eastern factories are coming through on schedule. The sales of electric heating devices, both large and small, have shown a satisfactory growth through the winter months, and interest in this form of heating is becoming widespread.

Los Angeles

Construction activity in Los Angeles is continuing unabated, as is evidenced by the building permits for the first fifteen days in March when 2,893 permits were issued with a valuation of \$8,521,870. This represents a slight gain in the number of permits issued over the corresponding period of last year, but a slump in the valuation as no large permits were taken out. Bank clearings

for the same period totaled \$334,545,742.28, which represents an increase of 16 per cent over the corresponding period of last year, when they amounted to \$287,103,634.57.

General business conditions are somewhat improved over the same period last month. However, there has been a slowing up in real estate transactions, which has affected both the wholesale and retail electrical business. The sale of electrical apparatus, while good, has not kept pace with the volume recorded prior to the first of the year, while other retail business has also slowed up to a slight extent.

The money market is somewhat firm and loans are tightening up. Collections are reported to be a little slow.

Recent rains have been beneficial, and farmers, orchardists and stock men are feeling more hopeful about the future. In consequence, business has been stimulated, and a general increase in sales volume is expected.

Salt Lake City

Plans are now under way for a record-breaking celebration in connection with the opening of the new steel plant near Provo, Utah. It is expected that this will be a state-wide event. Business interests throughout the entire Intermountain section feel that the starting of this new industry will mark a new era in the industrial activity of this region, and a great amount of interest is being taken in its development. The plant is expected to begin operations early in May.

Recent storms have given much encouragement to the farmers and stock raisers in this section, as it was feared for a time that there would be a lack of water during the coming season. This apprehension seems now, however, to be dispelled, and the agricultural districts are expected to enjoy a prosperous year.

Mining operations continue unabated, and there seems to be no reason to expect any material curtailment.

The Rocky Mountain Electrical Co-operative League has secured the services of a new field secretary, and is planning considerable activity in developing the field for all branches of the electrical industry.

Building operations continue to increase as the spring season approaches.

Business in general is becoming more satisfactory, and the outlook is exceedingly favorable.

Portland

Heavy production of lumber throughout January and February and light buying since the middle of the former month, coupled with good shipping conditions, have reduced the unfilled orders to such an extent that prices are weakening. During the last few weeks there has been some curtailment of production due to the slower demand from distant markets. Some of the mills have laid off one shift; others are working part time. There is an effort being made to maintain the organizations and

avert wage reductions, in the hope that in a few weeks the lumber market condition will again warrant normal production.

Residence construction continues to be the outstanding feature in building activity. Real estate agents report easy sales of lots and houses. The city's population is growing rapidly.

Intercoastal shipping is in excellent condition in the Northwest. This business has had a steady growth and now forms a considerable part of Portland's commercial activities.

Spokane

Conditions in the lumber industry in northeastern Washington and northern Idaho are very good indeed. In Spokane the woodworking plants are running at good output.

Analysis of the real estate situation indicates that there are not many vacant houses available and that prices for small modern homes have stiffened appreciably since last year.

One of the large match block plants is about to make an addition that will give a total capacity of 800 carloads per year when completed. The Great Northern Railway has announced plans for construction of a new roundhouse costing about \$150,000 with a capacity of 72 locomotives.

Mining conditions are exceptionally good, due to good prices for lead and zinc. The latest reports indicate a revival of activity in the Slocan district of British Columbia, where operations are to be conducted on a large scale, a program which involves the reopening of a number of old properties.

In a twelve days' campaign devoted to one make of washing machines, The Washington Water Power Company sold 78 machines, in three different models: 32 per cent were of the most expensive type, 54 per cent were of medium price, while only 14 per cent were of the cheapest type.

Denver

A fortnight of bad weather, with a good deal of snow, has held up building operations and outdoor improvements. It has had a marked effect on labor conditions, and retail business has not picked up in the manner expected early in March when a marked increase from the after-holiday dullness was noted. The moisture is, however, of untold benefit to the agricultural regions.

Stock raisers are optimistic over the outlook of the present season, especially sheep men, who view the wool situation as distinctly favorable.

Industrial improvements of major character continue to be announced, and a number of central stations are contemplating even greater programs than were indulged in last year. This is especially noticeable in the southern part of Colorado and in the Arkansas valley region.

In retail electrical trade, kitchen lighting campaigns, radio, and washing machines provide the principal activity. There is hardly a section of this region where a campaign is not being waged on one or more of these lines. Commercial lighting business is picking up, especially in display window equipment.

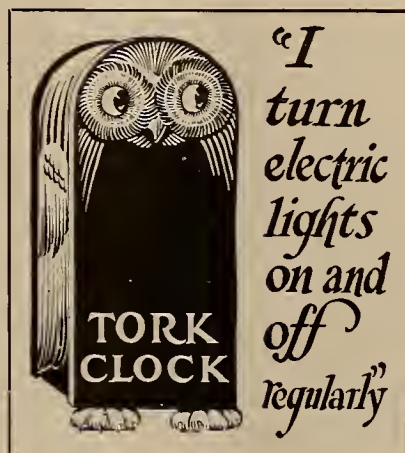
Jobbers report a steady volume with close competitive quotations, full stocks, and a tightening credit that promises improved conditions among the wholesalers.

Journal of Electricity

5 Cents a Copy

April 15, 1924

San Francisco



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Repeat these few remarks and you will reap orders. Begin this way "You need a



Electric Signs

TORK CLOCK

for turning electric lights on and off REGULARLY"



Protective Lights



Hen Houses

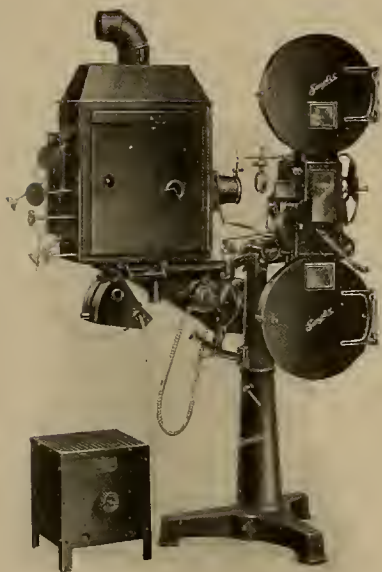
Install in place of the switch nobody turns regularly. Costs little to buy and nothing to operate.

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To provide adequate space for the offices of the San Joaquin Light & Power Corporation, the company has erected a ten-story building in Fresno, Calif., that is a credit to the industry. It is claimed that the efficiency of the employees has increased twenty-five per cent since the new building has been occupied.	
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Power

Who Retail Electrical Appliances?

MERCHANDISING channels and methods are two of the most important problems confronting the electrical industry today. The exact channels through which appliances are reaching the public and their relative effectiveness are unknown.

In this issue the Journal of Electricity presents the results of a survey conducted in a Pacific Coast city in conjunction with Electrical World. The survey gives a cross-sectional picture of the conditions as they exist. There is no comment by the editors. Observations are based solely upon obvious circumstances or statements of the retailers themselves.

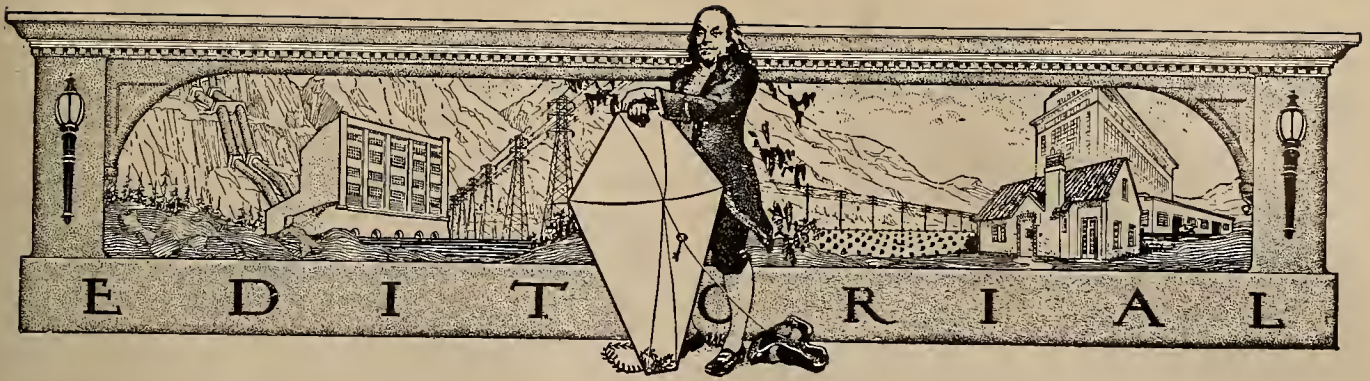
In conducting the survey the editors in charge personally interviewed every retailer in the city whose annual sales were sufficient to be included in the total. However, the figures themselves are not the most significant part of the article. The observations and statements of the dealers themselves are equally important. Such a wealth of material was uncovered that the article in this issue only covers the high spots.

We believe that the article is so important that it will be read by every one in the industry irrespective of his affiliations with any particular branch. We will welcome any discussion of the findings by our readers.



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Contractors
who prefer Quality
Products

Made at Pawtucket, R. I. by the **Tubular Woven Fabric Company**
Allied Industries, Inc. — Pacific Coast Representatives



“Go, and Sin No More”

AN interesting phase of government ownership and operation of public utilities is disclosed by the outcome of a suit instituted by W. W. Mines, a taxpayer, against the Board of Public Service Commissioners of the City of Los Angeles. Mr. Mines alleged the misuse of public funds expended at the direction of the commissioners for the purpose of manufacturing propaganda in favor of a bond issue of \$35,000,000 to provide funds for certain extensions and improvements in the Los Angeles municipal power system.

THE sum of money involved, something in excess of \$12,000, was alleged to have been expended for “jazz” bands, marcel waves for young women who formed the attention-compelling elements on floats that paraded about the city carrying the propaganda of the bond-issue proponents, quantities of circulars calling the opponents of the project “Boulder-dam liars,” and other “literature” of similar purpose.

TRULY, this is an edifying spectacle to those sincere but mistaken worshipers of the fetish of government ownership. It causes one to wonder if those who are so prompt to ascribe dark and sinister motives to all who earn their daily bread in the employ of a public utility corpora-

tion are quite so lily white as to qualify as critics themselves. Truly, “a man’s a man for a’ that,” and unethical practices are quite as reprehensible for the self-styled champions of the “Peepul,” as they would be for a mere private citizen or taxpayer.

AT any rate, Judge Edward I. Butler has rendered a decision in favor of the taxpayer in question, and now the commissioners find themselves in a parlous position. They may appeal the case to a higher court, or dig down in their personal pockets and reimburse the city treasury for the money thus determined to have been misused. It is doubtful if an appeal will be made to the higher court, however, for it is alleged that the \$12,000 covered by the complaint is merely small change compared to the actual amount expended in one way or another for purposes other than provided by the city charter for the development and distribution of municipal power. It has been pointed out that a Supreme Court decision might result in opening up a thorough investigation involving sums of money of considerable magnitude. It would appear more economical for the commissioners to dig down in their personal pockets, make up the amount in question, and sin no more.

How Many Members of the Electrical Industry Are Registered?

WHEN the political teapot is kicked over and a foul-smelling concoction of mud disclosed, the average citizen begins to wonder what ails our government. When the iniquitous features of a piece of legislation that he complacently sat back and let some group of radicals pass begin to make themselves felt, Mr. Citizen begins to howl. When taxes are mentioned, he froths at the mouth and prays for relief. The difficulty is not with the government nor the radicals nor taxes. It lies with the citizen himself. Theoretically, our governmental procedure is based upon the active participation of every citizen. Citizenship implies the right to vote. Voting requires registration. Mr. Citizen, in many cases, neither registers nor votes. He leaves that to George. He forgets to register until it is too late and if he should by any chance register, he is too busy to vote on election day.

The forthcoming November elections carry measures of decided importance to the electrical industry in many of the Western states. We submit that the members of the electrical industry are not different from other citizens. Checks in some of the utility companies bear out this statement. In one instance not more than thirty per cent of the head office force of one company was registered,—including some of the executives. In another company a similar situation was disclosed. A short campaign brought the latter organization close to one hundred per cent registered.

For self-interest reasons if for no others, the electrical industry should see that every single member is qualified to vote. Registration should be mandatory. Careful checks should be made to determine whether or not every employee has registered. Employees should be encouraged to see that all voters in their immediate household are registered and that all of their friends have done the same.

By so doing, not only will the industry be protecting itself, but it will be performing a civic and national service. If ours is a popular government, the people must take part.

How Much More Will Be Spent on the Colorado River?

REPORTS from Washington where hearings have been going on for several weeks before the House committee on irrigation of arid lands indicate the Swing-Johnson Bill calling for the construction of a dam by the government at Boulder Canyon has little opportunity of passing. In fact the collapse of the entire project is freely predicted. Testimony presented by the three Cabinet officers that comprise the Federal Power Commission urging the adjustment of existing differences seems to have been the final blow to the bill. All of which leads us to ask the question, "When will the Colorado River be developed?"

Speaking historically, the Colorado River Basin has been observed, studied, surveyed and made the subject of reports to Congress since the close of the

Civil War. More than \$350,000 has been expended by the Bureau of Reclamation alone since 1920. It is estimated that to date more than \$2,000,000 has been spent by other agencies of the government for surveys and reports. No means of checking the amount spent by private interests, the City of Los Angeles and others, are available but it is believed that an additional \$2,000,000 could be accounted for if a thorough investigation were possible.

We believe that the time has arrived for a definite statement regarding the government's attitude toward development of the river. The scope of this subject in many directions, its urgency in others and its opportunities, demand the determination of a definite policy. To date there is little or nothing to show for the \$4,350,000 expended except suggested temporary expedients. The time has arrived to stop quibbling, to forget politics and to get down to business.

No Longer Is the Architect to Blame

ONE of the difficulties in the way of more complete home electrification has been the lack of adequate wiring at the time a home was built. Many fine homes, to be occupied by those who could well afford the most extensive application of electrical equipment and who would have enjoyed its use, have been constructed with provision only for the most elementary use of electricity. In many cases this use has been confined to lighting only and there are many cases of record where even a limited number of auxiliary outlets was not provided.

Inasmuch as the architect generally is credited with the writing of all specifications for buildings of his design and supervision, it has been felt that the lack of wiring provision has been due to his indifference. However, in a recent survey made by The Architect and Engineer, it was shown that architects are now rather keenly alive to the importance of electricity in the home. Eighty-one per cent of the questionnaires returned indicated that even though the builder of a residence or apartment building did not indicate a desire for an electric range, water heater or air heaters, the architect recommended the installation of proper wiring to permit later tenants or owners to use such equipment. This is surely a long step ahead in the provision of electrical comfort in modern homes and such initiative on the part of the architects should be met with the hearty cooperation of the electrical industry.

An Example of Supervisory Nature

SIGNIFICANT figures bearing on the proposed retailing of power by the city of San Francisco were furnished by City Engineer O'Shaughnessy in a report made to the Hetch Hetchy advisory committee of the city of San Francisco last October but which was not made public until recently. According to the estimate of the city engineer at that time, it would cost the city 2.2 cents per kilowatt-hour to supply power for the Municipal Railways, as against

1.15 cents paid at the present time for power purchased from the Pacific Gas and Electric Company.

This figure is based upon the conditions obtaining on a city-owned distribution system using Hetch Hetchy power, supplemented by a steam standby plant to carry the load in case of an interruption. Without the city-owned steam standby plant, but paying for standby service from one of the existing companies, Hetch Hetchy power, according to Mr. O'Shaughnessy's report, would cost the Municipal Railways 1.98 cents per hour as against the present rate of 1.15 cents.

In either case, it is obvious that there would be a material loss to the city. In 1923, the Municipal Railways used 35,671,679 kilowatt-hours. Had the city supplied the power at that time and at the same time owned a city standby plant, it would have paid \$374,553 more for its power than it paid the Pacific Gas and Electric Company. If it had foregone the protection of the standby plant, it would still have suffered a loss, in that case of \$291,000.

It is one of the strange phenomena of human nature (or are supervisors human?) that in the face of this report the committee has gone on solemnly considering the advisability of city distribution of power. Apparently it is a much less painful process to consider a loss to the taxpayers' pocket book than to your own.

**Better Wiring Standards
Are Becoming Popular**

SINCE the advent of the new National Electrical Code at the beginning of the year, there have been many improvements in the wiring standards of Western cities. In the last issue of the Journal of Electricity a report of the new electrical ordinance of the city of Portland was printed. On another page in this issue the emergency recommendations of the city of Denver are published. In both cases the standards required are higher than those recommended in the Code. In both cases the combined electrical industry took an active part in the formulation of the ordinances. The action of the two cities cited is a splendid example of what can be done to improve wiring standards provided the industry itself shows that it is at least interested.

**How to Lose
a Customer**

ONE of the essentials of success in the conduct of any business is honesty and square-dealing. No human being is voluntarily going back to a dealer who has tried to exact more than a fair price or who has by his tactics developed a negative attitude in the purchaser. To merchandise successfully a dealer must have a reasonable and legitimate profit but this profit need not be exorbitant. There is the case of a woman who left a small electric appliance for repair and who, when she called for it again, was told that the repair charges were \$1.75. Inasmuch as the whole outfit had cost only slightly more than that and since the repair consisted of a renewal plug, she objected to the charge. After much arguing,

during which she stated that she would not pay the price but would instead buy another article elsewhere, an adjustment was made and she paid the compromise amount of \$1.25. When she had left the store it developed that the repair parts had cost thirty-eight cents, the labor in addition being only a small item. Such practices as these cannot but reflect discredit on the entire electrical industry and must result in restricted sales and a loss to every branch of the business.

**With Desire
But Not with Hope**

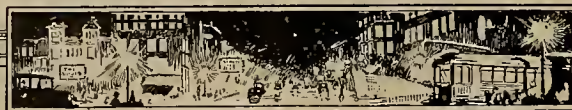
WHAT has become of our hopes for a reduction of income taxes? When Mr. Mellon made his recommendations to Congress, hope for a reduction of the practically confiscatory rates of taxation sprang up within the breast of every tired business man in the United States. Then, just as it seemed as though our dreams would come true, somebody removed the lid from the Teapot Dome. Now the so-called greatest deliberative body in the world has become metamorphosed, almost overnight, into a sort of grand jury and committee for the cleansing of the Augean stables combined.

That there is some basis of fire for the copious poison-gas clouds is probably true, but our legislative representatives seem to have lost their mental balance completely in their frantic efforts to besmirch the reputations of everybody in sight. Even the dead are not spared. How much of the clamor and beating of tomtoms is pure political propaganda, and how much is inspired by a genuine desire to discharge their duty to their constituents is difficult to surmise, nevertheless we are heartily in sympathy with the suggestion that the gentlemen of Congress drop their disinfectants and deodorants and proceed to the dispatch of their country's business. Even the newspapers are manifesting signs of a loss of interest as is shown by the diminution in the amount of space allotted to Teapot Dome affairs. When a scandal, like a ripe Camembert, begins to lose its tang, it should be interred peacefully. There are other things of far more importance to the American people.

**A Suggestion for
Collecting Bills**

NEWS from Lodi, California, tells of a remarkable increase in the payment of monthly lighting bills. It seems that the municipal plant was tied up the other day through some accident in the substation and for half an hour there was no current available for consumers. This accident occurred just after the announcement had been broadcast that forty-seven users of water and light had been disconnected on account of delinquent bills. Many of those in arrears took the absence of current as a sign that their service was cut off, whereupon they hastened to the city hall and paid up. It is not stated whether the interruption increased their appreciation of municipal service, nor do we recommend the system as a regular method of collecting bad accounts. We offer the item for what it is worth.

CURRENT COMMENT



While discussion of the Colorado River question has largely been confined to Washington, D. C., during the past several weeks, it has not been without its reflex in the West. The testimony before the congressional

Swing-Johnson Bill Subject of Comment

committee on the Swing-Johnson bill has been the subject of editorial comment in many of the

newspapers in the area most interested in the development of the river. Particularly that section of the report of the Federal Power Commission defining the policy that the government should adopt has caused much comment. The statement in question follows:

If the United States is to embark upon a general policy of public development of electric energy at federal expense, it should do so only after full consideration of what the step means. The present investment in the United States in central electric stations, that is, in those plants engaged in developing electric power for general distribution and sale, is approximately \$4,500,000,000. That investment will require to be more than doubled in the next ten years if the demands of industry are to be met. A policy of federal development would therefore require continuous expenditure of not less than \$500,000,000 per annum, for it could not be expected, in the face of such a policy supported by government funds and with tax-exempt properties, that private industry could afford to put any additional investment into the central station business. Under such circumstances we must assume that any such policy or program of federal activities is impracticable and undesirable.

Discussing this phase of the commission's report, the Salt Lake (Utah) Tribune says:

The attitude of the federal power commission was not unexpected. The fact that that commission is made up of the heads of three of the executive departments of the national government is rather reassuring to Utah. Their report is especially interesting because it points out so clearly that the policy which Congress is asked to father in the Swing bill would be a distinct departure in national government activities.

This attitude is borne out by the Los Angeles (Calif.) Times in the following editorial:

The Federal Power Commission, composed of the Secretary of War, Secretary of Interior and Secretary of Agriculture, urges upon Congress caution and delay in dealing with the Swing-Johnson bill and clearly and specifically states its reasons.

One objection to the bill is declared by the commission to be the fact that, in so far as the project proposed exceeds the requirements of flood control and irrigation, it embarks the United States upon a new national activity with undetermined future demands upon the national treasury.

"If the United States is to embark upon a general policy of public development of electric energy at public expense," the commission says, "it should do so only after full consideration of what the step means." The commission calls the attention of Congress to the danger of committing the government to a policy which would entail an annual outlay of \$500,000,000. The commission takes the position that such a policy would only be justified when private capital is not available, whereas in the case of power development on the Colorado River private capital is ready to undertake the work.

In its letter to the House the commission points out that in 1920 Congress adopted a general national policy with respect to power development and that this policy has been attended by marked success. The commission contends that there is no occasion for going outside of the terms of the Federal Water Power Act to obtain the production of all the electrical energy required at terms fair both to the developer and the user. The commission, therefore, opposes any special legislation modifying the established policy of developing power by private enterprise under full public control.

The commission declares that, whether river control is effected at Boulder Canyon or elsewhere, the disposition of any power developed should be handled by the Federal Power Commission under the existing laws.

The letter declares the Colorado River compact to be of primary importance and counsels caution in proceeding until the compact is ratified by all States or until it has been shown that it cannot be ratified.

As to the all-American canal the letter makes deterrent comment on the ground of great expense and adds that construction of an all-American canal will not obviate the necessity of constant dealings with Mexico in connection with irrigation or protection of lands in the United States.

A general agreement with Mexico and the ratification of the compact are two of the steps which the commission urges as necessary before the project can be satisfactorily dealt with.

The attitude of the commission is obviously friendly toward the project in its important phases of securing protection from floods, irrigation and power. It is clear that the objections contained in the message are not objections to the project, but objections to the method outlined in the Swing-Johnson bill, which is a political and not an engineering document.

On the other hand, the Los Angeles (Calif.) Examiner in urging the passage of the Swing-Johnson bill takes the opposite stand in the following editorial:

If this Boulder dam is ever built, as proposed in the Swing-Johnson bill, and as planned by the United States Reclamation Service, it will serve two great purposes: Furnish water and irrigation to the people of the Imperial and Coachella Valleys, a magnificently rich area equaling several small states of the Union, and enable development of 1,000,000 horsepower for the cities of southern California—power that will cost them far less money than they are now paying to power companies.

Quite naturally the power companies do not want such a dam and they are bringing every influence they know upon Congress to defeat the bill or have substituted for it another dam farther down the Colorado River, in a low altitude, which will be comparatively useless for power purposes. The enormous interests of these power companies are apparent at each congressional hearing on this subject. Engineers are brought forward to offer objections to the Boulder dam, which will be situated in a high altitude, where power may be easily and cheaply delivered from it, and transferred to California cities which could use it to make that beautiful region grow more beautiful and prosperous.

It is the desire of California cities, headed by Los Angeles, to form an association of cities to make use of the power from Boulder dam. This association would reimburse the government of the United States for every cent it may put into the dam, estimated at \$50,000,000.

If the big power interests see that they cannot bring about a low altitude dam they will "shift their delivery," as

the baseball pitchers do, and seek to have a dam built so far up the Colorado River that it would be difficult and costly to transmit the power that might be derived from it by those who will seek to develop the power for the benefit of the public.

Secretary Hoover has shrewdly sensed the situation and the shadowy hands back of the opposition to Boulder dam. His position will fortify those who are making the fight to save the farmers and fruit growers of the Imperial and other valleys, whose lives and properties are being threatened by the uncontrolled Colorado, and the users of power.

There is an almost identical situation in Washington, D. C., so far as power development is concerned. Great Falls, it has been repeatedly estimated by army engineers, could be harnessed and the power therefrom used to make electricity for all United States government buildings and the public at a cost far below that now charged. Virtually the only opposition that has ever manifested itself is from the local electric light company and the light and power companies throughout the country that are allied with it. These corporations do not want the government to do anything that will aid the consuming public. They want to control all light and power themselves, and at their own prices.

If the bill for developing Great Falls ever goes through Congress it will be in spite of the combined and powerful electric light and power interests of the country carefully marshaled by the local company.

Misunderstood by the public and misinterpreted by the advocates of municipal ownership, rates are one of the chief topics of discussion in the arguments over municipal ownership of electric utilities. So complicated is the subject of rate making and so uninformed are some of the most ardent advocates of public ownership that it is often an easy matter for them to sway public opinion with their statements. The fallacy of such arguments is evident in the following editorial from the Seattle (Wash.) Post-Intelligencer:

Small tract farmers near Tacoma have demonstrated in a remarkably illuminating way just how the Bone free power bill can be made to benefit the rural residents of the state.

Because the Bone bill grants the city-owned power plants the right to sell their surplus current outside their corporate limits without a tax, the inference has been immediately and erroneously drawn that it will benefit only the city dwellers. That misinformation is being assiduously circulated by selfish interests and efforts made to align city against country residents.

The small tract farmers of Brookdale, Elmhurst, Lakeview, Parkland and other communities just outside Tacoma have formed little cooperative, nonprofit-taking organizations, and have arranged to secure power within the Tacoma City limits, thus complying with the law, at wholesale rates from the city-owned transmission lines. They provide their own poles, wires and overhead equipment and wire their own homes. Actual costs of operating a little administrative organization are paid, Tacoma's wholesale bill paid, and the net costs then apportioned among the users.

One little cooperative organization, at Lakeview, starting less than two years ago, with seventeen members, now has fifty. It has constructed four miles of extensions at a cost of \$4,900, is entirely out of debt, and has twice cut the price of power to its consumers. First it charged 5 cents for the first forty kilowatt-hours, 3 for all used thereafter. Now it is charging 4 and 2, which is cheaper than the Tacoma resident rate.

When Aberdeen, Tacoma and Seattle complete their city-owned plants on the Wynooche, Lake Cushman and Skagit sites, they will be able to intertie and form a superpower system, publicly owned, extending more than 300 miles from the Canadian border, down the counties bordering on the inland side of the Sound, and across the foot of the Olympic Peninsula to the ocean.

Almost 60 per cent of the population of the state lives in nine counties which would have easy access to this superpower system when it is completed.

In some of these communities as high as 12 and 14 cents is being paid for the first forty kilowatt-hours. In Aberdeen the privately owned light company was buying its power from a hog-fuel steam plant operated by a sawmill for one-half cent and retailing it to city consumers for 10 cents a kilowatt-hour. The people indignantly determined to have a plant of their own and put themselves in position to bid against Seattle and Tacoma for manufacturing plants with cheap power, publicly owned and developed.

Here are clear-cut and concrete examples of what happens when the publicly owned plant enters into competition with the privately owned. Here is a definite reason why the rural residents of the state ought to be for the Bone bill. Here is a specific benefit promised them if the Bone bill becomes a law. It is plain, common horse sense, and anyone who will take the trouble to go over and see what the farmers living near Tacoma have done can determine for himself.

The Bone bill deserves the vote of every citizen of the state, whether he lives in the city or in the country. It deserves the support of everyone who realizes that Washington's future depends upon developing manufacturing as a substitute for the lumbering industry. Depends upon taking full advantage of the state's greatest natural resource—hydroelectric power—and conserving it by and for the people.

Superficially, the argument in favor of the procedure which the editorial urges is sound. Let us, however, devote a little study to the rates quoted. There are fifty consumers and the investment in the transmission line is \$4,900 or \$98 per consumer. On the basis of a fixed charge of 15 per cent, which is conservative when the questions of interest, depreciation and maintenance are taken into consideration, the annual fixed charges per consumer—which do not appear in the four-cent rate quoted—are \$14.60 per consumer or \$1.22 per month. If the average monthly consumption per consumer was 30 kw-hr., his bill, on the basis of the four-cent rate would be \$1.20, but the true cost to him would be \$2.42 when the fixed charges are taken into consideration. He is paying then, not four cents per kilowatt-hour, but slightly more than eight cents.

Further than this, the original seventeen consumers were forced to bear the burden of the initial installation of the line. Suppose at the end of two years there had not been fifty consumers, but fifteen. The rates they would be forced to pay would be exorbitant. During the years of development, these original consumers were shouldered with the development cost. In the case of a private company, this development cost is carried by the utility. It may be two years and it may be ten before the line would be on a profitable basis. Yet the company and not the consumer would have borne the burden.

Then there is the intangible value of utility service. Suppose, as frequently happens in this district, there had been a wind storm and the line blown down in several places. Under the scheme of operation which the editorial urges, the consumers would have been forced to pay the cost of reconstruction and at the same time have been without service for perhaps a week. A private company would have had a line crew on the ground within a few hours; the men might have worked all night, so that service could be restored in the shortest possible time.

The business of generating and distributing electrical energy is a complicated one. It is the duty of the utilities to see that the public realizes this, and it is their duty also, to see that mis-statements such as those in the above editorial are corrected.

DISCUSSION



A Smile Will Penetrate Even into the Highest Mountains

To the Editor:

Sir: I have read with interest several articles in your Journal regarding the Smiles Campaign. However, we are rather out of the beaten track and I have been unable to participate.

I am writing you to ask that you pass this letter on to some one who will send me the necessary application blanks, buttons, etc., so that my organization may be numbered among the "SMILES."

I will have about fifteen men on my payroll during the coming season. There is also the Government Electrical Department who I am sure will be interested, they will number about twenty.

E. T. CARPENTER, Chief Electrician,
Yosemite National Park Co.

Yosemite National Park, Calif.
March 28, 1924.

Public Ownership Can Be Justified in Isolated Cases Such as This

To the Editor:

Sir: After reading some of your editorials relative to municipal ownership for public utilities I thought it would not be amiss to send you our report on the Mineral County Power System up to Dec. 31, 1921, as well as the 1923 report.

Mineral County did not enter the public utility field with the mistaken idea of serving cheap power to consumers but solely for the purpose of protecting itself and maintaining a transmission line that was to be abandoned. The county has entered a field that the private utilities would not serve and in view of this condition I feel that Mineral County was well justified in taking the step that it did. It is true that the balance sheet for the year 1923 does not show a large profit, but the county is acquiring assets in the way of meeting bonds and notes outstanding, and it has not been an excessive burden on the taxpayers.

The principal lines of business in the country are mining, with one small section devoted to agriculture. Outside of this section, that is located along the Walker River, there is not a ranch of any size in the county.

Personally I do not favor municipal ownership of public utilities, but there have been several cases here in Nevada where private corporations would not be justified in extending transmission lines and making investments, and the only relief in these cases would be for the county or political subdivi-

sions to assume the responsibility, as was done by Mineral County.

JOE BEANE, Consulting Engineer,
Mineral County Power System.

Hawthorne, Nev.
March 24, 1924.

[Editor's Note.—The attitude of the Journal of Electricity has always been that the taking over of private enterprise by the government when adequate and satisfactory service was already being rendered, was unjustifiable. Where conditions are such that the needs of a community cannot be met under existing service, however, the community is perhaps justified in going into the business for itself.]

Study of Electric Range Load Will Be Made in Pacific Northwest

To the Editor:

Dear Sir: I am much interested in your editorial appearing on page 154 of the March first issue of the Journal of Electricity.

No doubt you have been advised that the present N.E.L.A. Range Committee, in conjunction with the Northwest Geographic Division, have a special range survey committee which committee at the present time is engaged in making a study of the electric range load and its value to central stations.

We know that the electric range can cook successfully and now we want to find out whether or not the range business is profitable to the central stations when service is sold at a price comparable with other kinds of fuel. By the time of our 1924 convention, the present committee hopes to be able to so present sufficient data showing what information we hope to gain and how we hope to obtain it, that the N.E.L.A. will appropriate sufficient money to complete our range study.

I am enclosing, herewith, copy of our N.E.L.A. Range Report to be presented at the May Convention, and would be pleased to receive your comments and suggestions.

J. F. ORR, Chairman,
N.E.L.A. Range Committee.

Boise, Idaho.
March 22, 1924.

[Editor's Note.—A complete story on the electric range survey which is to be undertaken in the Northwest is in preparation at the present time. It will be published simultaneously in the Journal of Electricity and in the Electrical World prior to the date of the National Electric Light Association convention at Atlantic City in May.]

Seemingly France Needs a Board of Fire Underwriters and an Electrical Code

To the Editor:

Sir: Knowing your interest in electrical heating appliances and heating devices, I thought that you would be interested in the latest invention from France in the form of a plug which can be attached to the ordinary twisted cord without the trouble of making a decent joint.

I thought you would be interested also in the attached slip entitled "Soyez Pratiques!!"

I do not speak French very fluently but the appearance of these devices would seem to indicate that

the public mind and public conscience, electrically, in France is not very far advanced.

P. H. BOOTH, District Sales Manager,
Edison Electric Appliance Co.

Los Angeles, Calif.

March 24, 1924.

The Future Will See Marked Industrial Activity in the Western States

To the Editor:

Sir: I have received yours of March 11 granting me permission to quote from the editorial in the January 15 issue of the Journal. I greatly appreciate your courtesy in this matter and assure you that full credit will be given to the source of the quotation. I was much interested in the editorial in the issue for March 1 commenting on "Western Waste and Western Industry."

It would seem that in the great natural resources of the west coast there is abundant opportunity for the development of manufacturing industries, which would enable people in your territory to save the huge freight bills which they now pay for commodities made mainly in the East.

I have been watching with much interest the growth in the manufacturing industries of the Pacific Coast and am thinking seriously of locating in that territory when my work here is completed.

I find the Journal very interesting and helpful.

I wish that you might find it possible to comment on the relative opportunities for "management engineers" or "specialists in waste elimination" in the western industries. If you did not care to express your views on the subject through the Journal at this time, would you be willing to write me personally on the matter?

R. M. HUDSON,
Division of Simplified Practice,
Department of Commerce.

Washington, D. C.

March 17, 1924.

Forest Service Would Cooperate in Public Service Conference

To the Editor:

Sir: I was greatly interested in your editorial entitled "A Public Service Conference" in the March 15 issue of the "Journal of Electricity."

While a Government Bureau such as the Forest Service is not ordinarily known as a public utility, I like to believe that in the management of the timber, water, recreation and grazing resources of the National Forests we are, at least, related to those big utility organizations which are delivering a needed commodity to the public and I believe that in any conference such as you suggest, we might have something of value to give regarding the industrial and economic relation of forests to utilities which are directly serving the people. On behalf of the organization I represent here in California, I would be more than glad to sit in on such a conference.

PAUL G. REDINGTON,
District Forester,
U. S. Dept. of Agriculture.

San Francisco, Calif.

March 24, 1924.



SOYEZ PRATIQUES!!
SI VOUS AVEZ A VOUS SERVIR DE L'ÉLECTRICITÉ

LA PINCE "P.A.M."

Le dernier cri! Est une prise de courant comme une pince à linge (avec des pointes mordant dans les fils) laquelle une fois accrochée

SANS DÉNUDER LE CORDON TRANSMET INSTANTANÉMENT LE COURANT.

ISOLEMENT PARFAIT.. N'ABÎME PAS LE FIL
AUCUN DANGER.. DURÉE INDÉFINIE

L'IDÉAL pour vous servir de vos lampes, troussees de voyage et tous appareils, partout où une prise de courant n'existe pas.

MERVEILLEUX pour mettre à votre portée interrupteurs et sonneries.. Pour balladeuses d'auto. Etalages, Organisations de Fêtes & Réclames

TOURISTES, AUTOMOBILISTES INDUSTRIELS, COMMERÇANTS PARTICULIERS. SOUVENEZ-VOUS DE

LA PINCE "P. A. M."


Demandez-la à votre électricien, Bazar, Grands Magasins, etc.

COMPTOIR DES..... INVENTIONS..... ÉLECTRIQUES.

SIÈGE SOCIAL: 4, Rue Péligon. **BÉZIERS**

DÉPÔT POUR PARIS-SEINE & SEINE-ET-OISE
L. RODRIQUE, 7, Rue d'Odessa, PARIS XIV^e

NOTICE GRATUITE, ÉCHANTILLON CONTRE MANDAT DE F^s 3.90
R. C. BÉZIERS A-7292



DEDICATED to better public service, the new ten-story building of the San Joaquin Light & Power Corporation at Fresno, Calif., stands as a monument to the public utility which has played such an active part in the development of the San Joaquin Valley. Embodying the latest features of design and construction, the new building has resulted in increased efficiency of employees and a pride in the organization that is rapidly communicating itself to consumers.

New Building of the San Joaquin Light & Power Corporation

By Roy Garman

Publicity Department, San Joaquin Light & Power Corporation, Fresno, Calif.

ADEQUATE space for all employees and modern facilities for their comfort have increased efficiency at least twenty-five per cent in the new ten-story, million-dollar office home of the San Joaquin Light & Power Corporation, Fresno, Calif., according to estimates of officials. This public service corporation and subsidiary companies serve nearly 65,000 consumers, with approximately 5,500 mi. of transmission lines, in seven counties of the San Joaquin Valley and three Coast counties, and have 10,400 stockholders, most of whom live in the great interior of California. About 90 per cent of the employees own stock.

Although the organization of nearly 400 employees moved into the new home but a few weeks ago, it is already apparent that better working conditions have increased efficiency to a surprising record. With approximately 200 rooms, 125 of which are occupied by the San Joaquin Light & Power Corporation, there is ample desk space and elbow room to meet every requirement. Noise-proof walls, floors and ceilings produce quiet surroundings for all employees; nearly a thousand globes and cove lights, with subdued rays reflected to the ceilings and walls and thrown back into every corner, eliminate glare, shadows and eye-strain; health of employees is improved and maintained at a high average by charged air through the ventilating system, operated from the basement by means of large ducts. Engineers of the company claim that this washed air, which has been purified through a violet-ray machine and cleansed with fresh water, is dust-proof and healthful. Fresh air is circulated and re-circulated continuously during working hours. Warm or cool air can be maintained at an even temperature with the same system.

The new building was completed late in February, fourteen months after construction work started; occupied by all departments by March 3, and formally opened for public inspection March 5, 1924, when three elevators, operating at a speed of 600 ft. per minute, were kept busy transporting thousands of interested consumers to the tenth floor, where the employees' auditorium, library, and electrically-equipped modern kitchen are located.

This auditorium is used by employees, members

THE demands for electrical service in the territory served by this company have resulted in a growth that requires extensive quarters. These new quarters have resulted in increased efficiency of employees, reduction in necessary personnel and an organizational pride that is rapidly communicating itself to consumers.

of the San Joaquin Power Club, a social organization; for important conferences of executives and employees, and for conventions. Two weeks after the new building was occupied, seventy-five delegates from all parts of the Coast attended a three-day convention of the Technical Section of the Pacific Coast Electrical Association, all

sessions being held in the new home of the San Joaquin Light & Power Corporation. Motion pictures of San Joaquin power development and of meters were shown.

A stage for entertainments by employees occupies one end of the auditorium, with a library at the other end, separated by folding doors, which are opened for large meetings and parties. Over the library is a fire-proof motion picture projection room. From the auditorium a dozen doors lead to the promenade, overlooking the business district of Fresno, with a beautiful view of the skyline. Mounted on the balustrade of the wide promenade are huge cauldrons, from which live steam, piped from the basement, is released into the night air on special occasions. Through this live steam, as it escapes, are played long fingers of light of different colors, from floodlights, concealed from view of persons in the streets below.

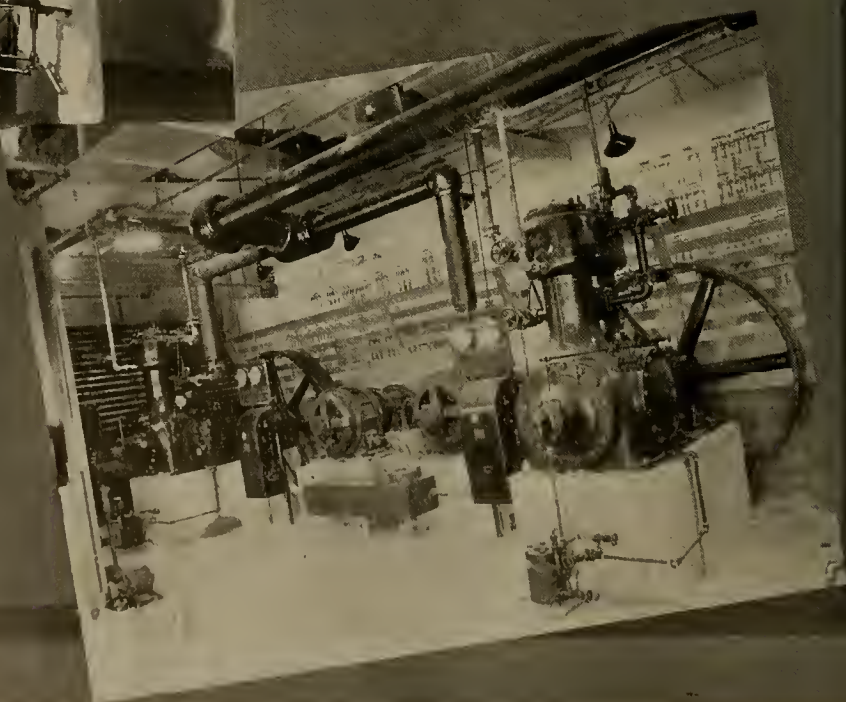
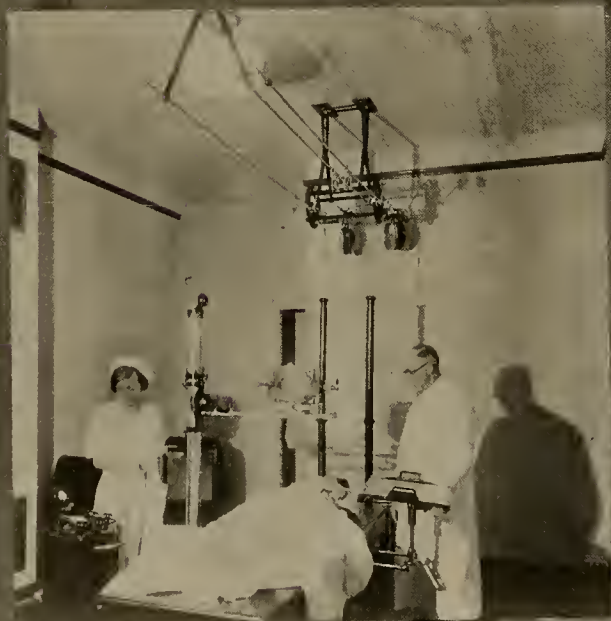
Special Lighting of Exterior

The building is said to be the most brilliantly illuminated office home on the Pacific Coast. Exterior lighting is in three stages, the most powerful floodlights being on top of the marquee, which covers the sidewalk on two sides. These lamps flood the structure to the eighth floor with any colored light desired. The second stage is on the balustrade and the third is on the corners of the red tile roof, illuminating two radio towers. Architectural beauty of the new building is revealed in a most spectacular way by these floodlights.

Surmounting the peak of the roof is an electric sign reading, "San Joaquin Power," with letters eight feet high, which is set each night but kept flashing on special occasions. This sign is visible many miles away in the fruit-growing districts surrounding Fresno. A number of newspaper editors in the community have called the building the "Tower of Jewels of the San Joaquin Valley."



MODERN in every respect, the new building includes many novel features. At the top is shown a view of the telephone exchange with its four switchboards. In the center is a part of the medical department showing the X-ray equipment. At the bottom is a part of the heating, ventilating and refrigerating equipment in the basement with the power switchboard in the background. The compressors shown cool both the air and water used in the building.





THE lobby and lower floor of the building have more the appearance of a bank than a utility office. At the top is a general view of this lobby showing the merchandising department of the Valley Electrical Supply Company in the background. In the center is a view of the consumers' counter where applications are made, bills paid and complaints looked after. At the bottom is a view of the consumers' department which occupies the entire second floor.



Of Class A construction, the structure occupies a lot 75 ft. x 150 ft.; is 174 ft. high from street to top of the roof, and 235 ft. from street to top of radio towers, making it the second tallest skyscraper in the city of Fresno.

More than 400 windows bring an enormous amount of natural light into every room. These windows are never opened, except to wash them, inasmuch as the ventilating system takes care of all changes of air. There are twenty-four locker and wash rooms, each equipped with Airdry electric towels, thirty-nine of them in all. No other towels are used. These electric towels are operated by individual motors, which deliver a strong current of warm air onto the hands and face when the foot is pressed lightly on a pedal switch near the floor.

Transportation within the building is handled quickly and with efficiency by three gearless Westinghouse traction type elevators, equipped with Llewellyn variable voltage controllers, operating at a speed of 600 ft. per minute. The cost of these elevators is placed at \$62,000. The elevator penthouse is in the attic, where an individual cooling, heating and ventilating system is maintained for the auditorium and library on the tenth floor. This is entirely independent of the main system located in the basement. A large water tank is also in the attic. Water and power supplies for the building are controlled from the basement.

First contact with the public is on the ground floor, where ideal surroundings for consumers and employees are found. The lobby, finished in terra cotta, bronze and plate glass, with concealed cove lighting, is the largest room in the entire building. Here, light, power and water bills are paid by consumers at a long marble counter. Communication with the billing and record division of the Fresno district consumers' department on the second floor is maintained efficiently by means of pneumatic tubes and company telephones. Delays are thus eliminated and consumers are given speedy service.

The lobby has cosy rest benches, banked by large palms and ferns, for consumers' use. Beautiful rugs and home furniture, effectively set off by draperies, table lamps, floor lamps and many electrical appliances, are displayed in the lobby, near the plate glass windows. This modern show room, with pleasing effect, for reaching the public eye and creating interest in developments for the electrically-equipped home of today, has dozens of modern conveniences for the busy housewife and something she wants for every room.

A corner of the lobby is set aside as a neat office for the stock sales department and information bureau. This arrangement, with two desks, telephones, booklets and selling arguments for San Joaquin Power stock, and comfortable chairs for consumers, is very satisfactory as a means of forming first contact with the public in a beautiful setting, restful to eye and nerves, and at a place where the housewife, tired from a busy shopping tour, has stopped to rest for a few minutes. Here, also, other consumers have come to pay light, power or water bills, or dropped in to inspect the building or see one of the employees.

A portion of the lobby is occupied by the sales department and display rooms of the Valley Electrical Supply Company, which also has a part of the basement and mezzanine floor, overlooking the consumers' counter and lobby. A sidewalk show window is a silent salesman for electrical appliances as well as a demonstration of modern window and store lighting for merchants. By means of footlights and overhead globes, all shadows are removed from articles on display. Living, dining and bedrooms, including furniture, wall paper and electrical fixtures, and a model electrical kitchen, are shown.

Advantageous Arrangement of Offices

Executive offices are on the ninth floor. Here also is the advertising and publicity department. The legal and financial offices are also on this floor. The accounting department for the San Joaquin Light & Power system outside the Fresno district is on the eighth floor. The Fresno City Water Corporation, a subsidiary company, is on the fourth floor. The Midland Counties' Public Service Corporation, another subsidiary, is also in the building.

Additional facilities and increased space in the new building have served well in the expansion of promotional efforts of the publicity and advertising department of the company. In the consumers' department, space, twenty times greater than that at the old home, has aided greatly in developing good will, giving all employees a better opportunity to meet the public, under more attractive surroundings, and creating a better spirit of cooperation among the employees themselves. Every advantage is afforded the organization for building good will and at the same time many handicaps are removed from the efforts of the departments handling public relations.

The San Joaquin Light & Power Corporation had occupied its old quarters for eighteen years. There was ample room there in 1906. But every available inch of space was occupied ten years later, and for the past three years congestion has been such that employees were constantly in one another's way. Many departments had to be located outside the main office building. There was no chance under such conditions of getting complete efficiency out of the organization. Customers resented being sent from one office building to another to transact business.

But all this is of the past, and San Joaquin Power is housed now in a building that is regarded as the last word in office architecture. The general manager is in immediate contact with his organizational, engineering, legal, and publicity departments, which are located on the same floor. He can summon any department head by the mere pushing of a button. He can gather all his executives together in five minutes. Every executive has his own private office, and has his departmental employees close at hand and under his personal supervision at all times.

Fewer employees are required than under the old conditions, and there is a consequent saving in overhead expense. And there is a new dignity and a prouder bearing on the part of all,—an inspiration from the dignity and pride of the new quarters.

Who Retail Electrical Appliances?*

DISCUSSION was somewhat heated among a group of Pacific Coast electrical men as to what should be done in the matter of increasing the volume and safeguarding standards in the retailing of electrical appliances. "Well," said one of the speakers, who was contending that the central station should set the pace in merchandising, "who does sell appliances anyhow?" There was no answer to the question. Various members of

the group ventured opinions to the effect that the department store was taking over a large part of the business and that the hardware store was a coming field—but no one could hazard a guess as to what proportion of the appliance business was being handled through the different channels in their community. Lack of information on the subject of who sells appliances is not purely local—until recently there has been no one who had studied the situation sufficiently to know exactly what were the outlines of the problem. Suggested remedies, in consequence, have been somewhat vague.

In order to be able to answer intelligently the question as to the volume of appliance business through retail channels, *Electrical World* has been conducting a survey of retail conditions in various sections of the country. This survey has recently been extended to the western territory and the resulting conclusions are of especial western interest. The accompanying table covering conditions as they appear in one of the larger cities of the Pacific Coast territory is published simultaneously in the *Journal of Electricity and Electrical World*. Although it does not purport to be complete, the investigation was nevertheless carried to such a point that it may reasonably be said that the remaining small firms are so insignificant as not to affect the total. Seventy dealers in all were interviewed.

The city in question is one of those in which the power companies are out of the merchandising business with the exception of electric ranges, water heaters and air heaters. The city is the jobbing center for its district and also the retail shopping center for a large metropolitan area outside the city limits. This fact may possibly color the figures to some extent by increasing the department and household furnishing store sales at the expense of those of the small retail dealers, the larger stores selling

THE Journal of Electricity prints herewith the results of a survey conducted by Electrical World in one of the larger Pacific Coast cities, discussing it from a local rather than a national angle. The interpretation of the figures is of particular significance to every member of the electrical industry, indicating, as it does, the trend of appliance merchandising. It should be remembered in this connection that observations regarding conditions or trends are based solely upon obvious circumstances or statements from the dealers themselves and do not represent the opinions of the editor.

to the outside element as well, whereas the shop catering to a particular district is restricted to the population of the city itself.

It is interesting to find from the figures as tabulated that in this community where the power companies are out of the retail merchandising field, a relatively high proportion of the electrical appliances are sold through non-electrical channels. In other words, the business given up by the central station does not,

in this case at least, gravitate to the electrical dealer. The figures indicate that the electrical dealers in this city are handling slightly less than one-half of all the retail sales of electric appliances. In the previous communities surveyed by *Electrical World* in which the central station has been in the merchandising field, roughly 75 per cent of the business was handled through strictly electrical channels, between the power company and the electrical dealers. When the figures are analyzed somewhat more closely, it is apparent that whereas the electrical dealers in this western city stand relatively high in the sale of the larger appliances, doing 59 per cent of this business, they handle only 25 per cent of the smaller appliances. Such articles as irons, percolators, toasters, heaters, curling irons and waffle irons, in other words, are 75 per cent in the hands of the non-electrical outlet—the department store, household furnishing store and the hardware dealer.

In general, it may be said that all the various branches in the retail electrical field are united in approving the stand of the power companies in remaining out of the merchandising business. They felt that the situation was being adequately handled in its present form and they obviously dreaded the competition which the power company entrance into the merchandising field would set up.

The one item now handled by the power companies is the electric range. These are sold somewhat below list price, but opportunity is offered the dealer to sell them on the same terms. A special flat price is made on wiring and if the contractor's bid for the installation exceeds this flat charge the excess is absorbed by the power company. The remainder of the industry does not sell ranges to any appreciable extent. One or two are sold during the year by the larger hardware stores and they are kept in stock by the furniture stores in order to complete their stock, but 95 per cent of the range business is in the

*Published in conjunction with *Electrical World*.

hands of the central stations. There is some tendency, apparently, for at least one of the power companies to pass this business so far as possible into other hands and policies are not altogether crystallized. It is perhaps pertinent in this connection to state that the opposition to the handling of electric ranges was not placed wholly at the door of the difficulty of competition with the power company. One of the household furnishing stores stated a reluctance to go into the business until the margin of profit is greater. The hardware stores carrying ranges complain of the high installation costs and, to some extent, of the high initial cost of the range itself.

The Electrical Dealers

Thirty-five electrical dealers were interviewed, not all of them in the class of stores doing an electrical business of any size. Within the group, nine stores carried on a store merchandising business principally, featuring general electrical merchandise as their main dependence. Of these only five were of

the electrical dealer was standing still, but that he was "progressing" backwards. One dealer expressed his views on this subject by pointing out that the department store and large furnishing establishment, as well as the chain of hardware stores, were all in a position to increase the capital back of their electrical departments as fast as the business could grow. The electrical dealer, on the other hand, is compelled as a rule to obtain his capital from his own earnings and cannot expand as fast as his business would warrant. "The trade is there," he stated, "whenever we can secure the money to go out after it."

There is a contractor-dealers' association in the city, but the feeling was generally expressed that it was more interested in developing the contracting field than that of electrical merchandising. There was considerable criticism on the part of the individual dealers against unfair practices and price cutting on the part of their competitors, both among their own number and in the non-electrical field.

PERCENTAGE OF APPLIANCES SOLD BY DIFFERENT RETAIL OUTLETS

	Washing machines	Vacuum cleaners	Ironers	Flat irons	Curling irons	Toasters	Percolators	Ranges	Waffle irons	Air heaters	% of all small appliances	% of all large appliances	% of all appliances sold
Hardware stores.....	7.2%	7.3%	5.7%	20.6%	10.7%	15.4%	13.4%	3.1%	12.4%	25.2%	16.2%	7.2%	9.0%
Household furnishing stores.....	33.8%	11.8%	27%	15.1%	6.7%	27.5%	31.4%	.....	11.3%	8.7%	17.7%	21.8%	20.1%
Department stores.....	4.2%	15.5%	4.4%	25.6%	54.5%	30.9%	37.5%	.....	62.6%	23.5%	38.5%	10.2%	16.0%
Furniture stores.....	1.6%	1.6%	.....	2.9%	0.5%	1.5%	3.2%	1.2%	1.2%	2.5%	2.0%	1.8%	1.7%
Contractor-dealers.....	2.4%	2.3%	0.5%	15%	9.7%	6.2%	4.8%	.....	4.0%	19.6%	9.8%	2.2%	3.8%
**Electrical stores.....	10.8%	15.8%	5.3%	20.5%	17.2%	17.4%	9.2%	.....	8.2%	19.0%	15.1%	13.3%	13.2%
Specialty shops.....	40.0%	45.7%	57.1%	1.3%	0.7%	2.1%	0.5%	.....	0.3%	1.5%	0.7%	43.5%	32.4%
All electrical stores.....	53.2%	63.8%	62.9%	35.8%	27.6%	25.7%	14.5%	.....	12.5%	40.1%	25.6%	59.0%	49.4%
Central stations.....	.....	.....	.....	.....	.....	.....	.....	95.7%	.....	.....	.....	.....	3.8%

*Washing machines, vacuum cleaners, ironing machines (ranges not included).
**Dealers neither engaging in contracting business nor specializing on the heavier appliances.

any size. Eighteen belonged to the group of contractor-dealers, among whom eight could be called stores of any size. Eight of the shops were frankly specialty businesses, concentrating on some one or two appliances, such as washing machines or vacuum cleaners, doing most of their business outside of the store itself and carrying the smaller appliances, where they handled them at all, purely as an auxiliary feature. This is not shown in the table. Several of the dealers were extending their field to include allied lines of merchandise, such as novelties or small household equipment. It is interesting to find to what a large extent radio equipment is being used to supplement—in some cases even to supplant—the regular business. One important electrical dealer went so far as to say that over 50 per cent of his business during the past six months has been in radio.

On the whole the feeling within this group is rather pessimistic. Several dealers who have been in the business for years are planning now to withdraw—or, at least, say that they are so planning. Many of them testified that their business was not materially increasing from year to year. In the face of reports of 25 per cent yearly increases from the non-electrical group, this would mean not only that

Non-electrical stores, they state, are apt to feature electrical "specials" and sell at reduced rates, making up the loss by overcharging in other departments. There was also some complaint of the jobbers selling material to friends of employees at wholesale prices, although one dealer made the statement that the "wholesale only" policy was very consistently maintained by the jobbers and that conditions in this respect were much better in this district than elsewhere. One or two dealers complained that margins were not large enough to afford a profit—others, on the contrary, seemed to feel that larger margins would result in greater price cutting.

Taking all electrical goods sold, the electrical dealer group was found to be selling 49.4 per cent. The larger appliances—washing machines, vacuum cleaners and ironers—made up 88 per cent of their business, while the 8 specialty shops (those handling washing machines or vacuum cleaners as a feature line with small appliances as a minor factor, if at all) did 32.4 per cent of the business.

By segregating the types of store coming under the general classification of electrical dealer, it was found that the eight specialty shops interviewed were doing just about twice the-business done by all twenty-seven of the other stores put together. As

SALES OF PRINCIPAL ELECTRICAL APPLIANCES, SHOWING QUANTITY, VALUE AND PROPORTION SOLD BY HARDWARE STORES, DEPARTMENT STORES, ELECTRICAL DEALERS AND THE CENTRAL-STATION COMPANY

KIND OF DEALER	Washing Machines	Vacuum Cleaners	Ironers	Flatirons	Curling Irons	Toasters	Percola- tors	Ranges	Waffle Irons	Small Air Heaters	Total Sales Each Class of Store	Per Cent of Total for City
HARDWARE STORES												
Store A-1.....				100	50	100	75		50	100		
Store A-2.....				100	50	50			50			
Store A-3.....	100	300	3	2000	2000	350	200	12	175	350		
Store A-4.....		6		60	60	25	36		12	36		
Store A-5.....				175	400	36	12		6	36		
Store A-6.....	150	500	10	300	175	100	75		50	100		
Store A-7.....				125	75	125	75		75	100		
Store A-8.....		3		50	50	30	12		6	36		
Store A-9.....				100	50	150	75		80	150		
Store A-10.....				125	80	130	60		50	125		
Store A-11 (10 misc.).....				476	246	185	74		77	114		
Total.....	250	809	13	3611	3236	1281	694	12	631	1147		
Total Value.....	\$38,500	\$48,540	\$2,305	\$18,490	\$5,770	\$8,729	\$9,513	\$2,100	\$6,857	\$10,006	\$150,810	9.0
Per cent of electric appliance sales	25.5	32.1	1.5	2.2	3.9	5.8	6.3	1.5	4.5	6.7		
HOUSEHOLD FURNITURE STORES												
Store B-1.....	1000	1000	50	750	500	700	500		100			
Store B-2.....				100	50	125	80		75	100		
Store B-3.....	52	10		75	6	15	15		5	18		
Store B-4.....	100	300	12	1500	500	2000	1000		250	250		
Total.....	1152	1310	62	2425	1056	2840	1595		430	368		
Total Value.....	\$181,280	\$78,625	\$10,910	\$13,700	\$3,640	\$15,531	\$22,275		\$6,267	\$3,462	\$335,690	20.1
Per cent of electric appliance sales	53.9	22.9	3.3	4.2	1.2	4.7	6.7		2.0	1.1		
DEPARTMENT STORES												
Store C-1.....	60	400		1500	1500	1000	1000		2000	200		
Store C-2.....	90	275	10	1350	10000	1800	1000		225	225		
Store C-3.....				1000	2000	300	150		50	1000		
Store C-4.....		600		200	250	100	75		25	100		
Store C-5.....		250										
Total.....	150	1525	10	4050	13750	3200	2225		2300	1525		
Total Value.....	\$22,500	\$103,000	\$1,800	\$23,175	\$29,300	\$17,550	\$26,625		\$34,560	\$9,350	\$267,860	16.0
Per cent of electric appliance sales	8.4	38.9	0.6	8.6	10.9	6.5	9.9		12.8	3.4		
FURNITURE STORES												
Store D-1.....		75		125		25	100			100		
Store D-2.....	60	100		100		50	25	4	25			
Store D-3.....				100		25	12		4			
Store D-4.....		10		125	24	24	12		12			
Total.....	60	185		450	24	124	149	4	41	100		
Total Value.....	\$9,000	\$11,100		\$2,625	\$120	\$930	\$2,134	\$700	\$585	\$900	\$28,094	1.7
Per cent of electric appliance sales	32.0	39.4		9.3	0.4	3.3	7.8	2.5	2.1	3.2		
ELECTRICAL DEALERS												
CONTRACTOR-DEALERS												
Dealer E-1.....				200	200	75	12		6	100		
Dealer E-2.....	37	50	1	500	50	45	10		6	28		
Dealer E-3.....	3	12		100	200	50	75		25	50		
Dealer E-4.....	10	30		400	150	70	40		25	150		
Dealer E-5.....	2	6		250	700	100	25		12	150		
Dealer E-6.....	4	15		300	200	24	24		12	100		
Dealer E-7.....	8	56		310	120	48	45		36	156		
Dealer E-8.....	6	20		50	25	12			4	20		
Dealer E-9 (10 misc.).....	17	31		341	441	189	58		49	171		
Total.....	87	220	1	2451	2086	613	289		175	925		
Total Value.....	\$13,130	\$13,850	\$177	\$13,600	\$5,225	\$3,510	\$3,438		\$2,230	\$7,775	\$62,935	3.8
Per cent of electric appliance sales	20.9	22.0	0.3	21.6	8.3	5.6	5.5		3.5	12.3		
APPLIANCES ONLY												
Dealer F-1.....	20	50		600	200	100	100		50	200		
Dealer F-2.....	3			750	150	150	75		100	20		
Dealer F-3.....	60	100	12	50	100	75	24		24	36		
Dealer F-4.....				83	120	56	65		10	42		
Dealer F-5.....	300	1500		1400	3000	1200	240		100	500		
Dealer F-6 (4 misc.).....	3	14		324	130	142	50		76	100		
Total.....	386	1664	12	3207	3700	1723	554		360	898		
Total Value.....	\$58,300	\$105,000	\$2,130	\$17,750	\$9,238	\$9,850	\$6,580		\$4,525	\$7,550	\$220,923	13.2
Per cent of electric appliance sales	26.4	47.5	1.0	8.0	4.2	4.5	3.0		2.0	3.4		
SPECIALTY STORES (Vacuum Cleaners and Wash- ing Machines)												
Dealer G-1.....		12		6		2						
Dealer G-2.....		3000										
Dealer G-3.....	520	550										
Dealer G-4.....	650	300	130									
Dealer G-5.....		60										
Dealer G-6.....	100	450										
Dealer G-7.....	35	350		140	50	15	20		10	45		
Dealer G-8.....	100	100		27	100	40	6		4	25		
Total.....	1405	4822	130	173	150	57	26		14	70		
Total Value.....	\$212,390	\$303,780	\$23,068	\$942	\$376	\$318	\$314		\$149	\$582	\$541,918	32.4
Per cent of electric appliance sales	39.2	56.0	4.3	0.18	0.07	0.06	0.06		0.03	0.1		
CENTRAL-STATION COMPANY												
Company H-1.....								205				
Company H-2.....								152				
Total.....								357				
Total Value.....								\$63,120			\$63,120	3.8
Per cent of company's elec. appl. sales.....								100				
GRAND TOTAL												
All dealers.....	3490	10535	228	16367	24002	9838	5532	373	3951	5033		
Value.....	\$535,100	\$663,895	\$40,390	\$90,282	\$53,668	\$56,418	\$70,879	\$65,920	\$55,173	\$39,625	\$1,671,350	100.0
Per cent of total appliance sales.....	32.0	39.6	2.4	5.4	3.2	3.4	4.2	4.1	3.3	2.4	100.0	

applied to the total appliance business done in the city, it was found that 18 contractor-dealer establishments were doing 3.8 per cent of the business, 9 straight electric shops handled 13.2 per cent of the business, while the 8 specialty shops (those handling washing machines or vacuum cleaners as a feature line with small appliances as a minor factor, if it all) did 32.4 per cent of the business.

It was interesting to find that whereas, in one or two cases, prices reported by contractor-dealers on a given article were higher than those reported by hardware stores—on the other hand, in an equal number of instances, the situation was reversed and

enough business to be included in this survey. Two large hardware concerns dominate the field, but several of the smaller establishments have well arranged electrical departments. In most cases they expressed themselves as satisfied with the margin of profit allowed—and with the electrical field in general.

Prices as a rule when reported in averages were not materially below those charged in other stores—in fact, they ranked above the electrical dealer in the range of prices in quite as many cases as they were below. There is some evidence that occasionally a shipment of cheap material has been carried and sold at a low figure. That there is a reaction against this is indicated by the statement of a manager of one of the larger stores who said that he had noted considerable feeling on the part of the public against cheap appliances because they do not stand up. Out of two gross of cheap toaster stoves sold on one occasion, he said, one gross had been returned. Cheap percolators also fail to justify the handling.

Washing machines and vacuum cleaners form the backbone of the electrical business done by the larger stores, but are seldom carried by the smaller hardware dealers. Of the smaller appliances, small air heaters hold the record of the largest sales, percolators, toasters and waffle irons following in the order named. The waffle iron is the only one of these

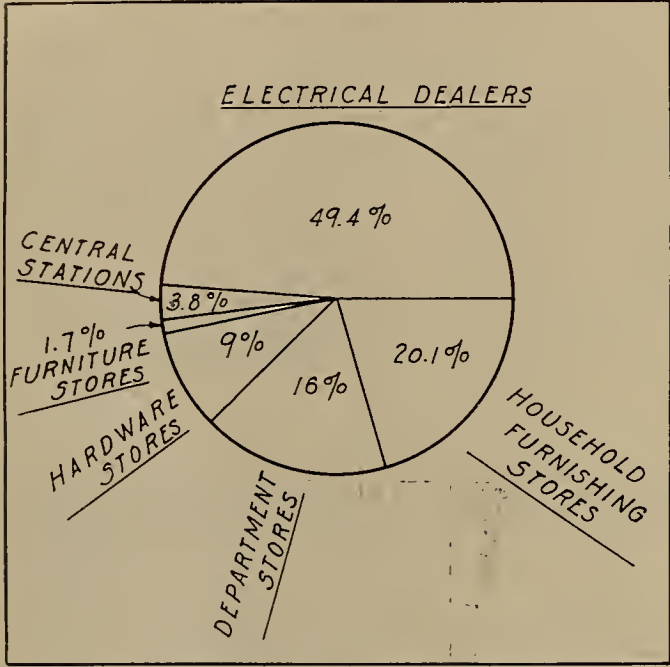


Diagram showing percentage of total appliance business done by each class of retail outlet.

the electrical dealer quoted the lower price. Outside the field of the larger appliances the electrical dealer apparently sells a greater proportion of electrical irons and of air heaters than any other one group and these, in fact, make up the largest items on his cash register.

Some of the electrical dealers have attractive establishments and their goods are well displayed—but many are not in this favorable condition. Only a few are aggressively developing their field.

Non-Electrical Outlets

There is apparently an equal number of non-electrical outlets in the city selling electrical appliances and these, collectively, do 46.8 per cent of the business in this field. They do 41 per cent of the larger appliance business and make 75 per cent of the smaller appliance sales. In general their condition appears to be healthy. They report a steady increase in their electrical business, amounting to from 20 per cent to 25 per cent annually.

The Hardware Stores

The hardware stores carrying electrical equipment are numerous, twenty stores doing a large

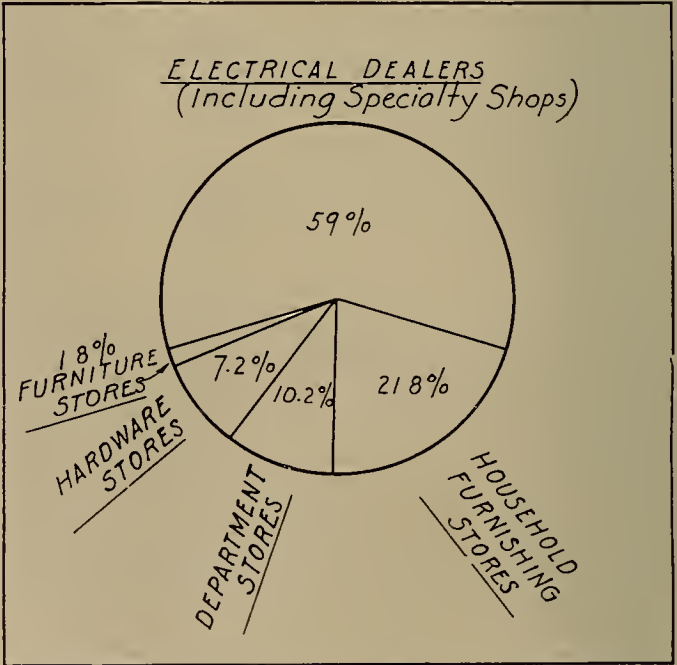


Diagram showing percentage of large appliance business (washing machines, vacuum cleaners and ironers) done by each class of retail outlet.

items on which the price was below that generally quoted by other dealers.

Hardware stores handled 9 per cent of all the electrical appliance business done in the community, 7.2 per cent of the larger appliance business and 16.2 per cent of the small appliance sales.

Household Furnishing Stores

The largest factor in the retail distributing field outside of the electrical dealer was the household

furnishing store, which handled 20 per cent of the total business. Two large concerns dominate the field, doing 92 per cent of the business handled through this type of outlet. Their particular strength lies in the washing machine field, apparently, where they sell 33.8 per cent of the machines sold in the district. This one item makes up a little more than one-half of their business. Vacuum cleaners rank next, amounting to about one-fifth of their business. In the field of ironing machines, although the actual sales were only 3.3 per cent of their business, they nevertheless sold 27 per cent of all ironing machines

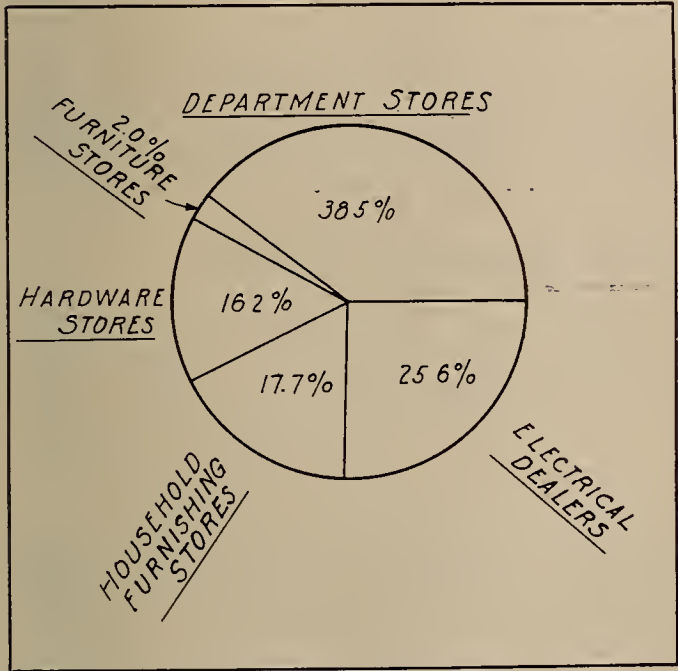


Diagram showing percentage of small appliance business done by each class of retail outlet.

sold in the city. In the sale of toasters and percolators they also handle about one-third the sales in this field.

Their prices as a rule are rather higher than those of the electrical dealer, with one or two exceptions. Their goods are well displayed and they use department store methods of merchandising. Time payments are encouraged on larger appliances and considerable attention given to the problem of adequate servicing. One of the firms gives a year's guarantee with all appliances sold.

Department Stores

Several department stores handle electrical equipment, two of them on a comprehensive scale. In all cases the electrical appliances were carried as an adjunct to the household furnishings department and there was a general feeling that material requiring too technical a sales and servicing department was not proper for the department store field. This is perhaps the explanation for the fact that, although the department store does 38.5 per cent of the small appliance business of the community, it handles only 10.2 per cent of the larger appliance business, vac-

uum cleaners making up by far the largest part of the sales in this group. It sells 62.6 per cent of the waffle irons sold in the district and 54.5 per cent of the curling irons. More toasters and percolators are sold in the department stores than by all the electrical dealers of the community put together. The figure for its share of all electrical business is 16 per cent.

Prices quoted are low on curling irons, toasters, percolators and air heaters, but high on all other items. The two larger stores do not do a cut price business, but they occasionally put on specials in the electrical department, following their custom in other fields. They are not concerned with prices quoted by competitors, nor by their merchandising practice, feeling that they have their own clientele. They unite with the other classes of establishment, however, in desiring the central station to remain out of the merchandising field.

Furniture Stores

Several furniture stores carry electrical equipment, but they are not an important factor in the electrical merchandising field, handling not more than 3.8 per cent of the total sales. As a rule they carry high quality merchandise and their prices are high. They do not particularly go after this type of business, but rather meet the wishes of their customers in having all types of household equipment under one roof. They do not handle ironing machines, but on the other hand, they do carry electric ranges and

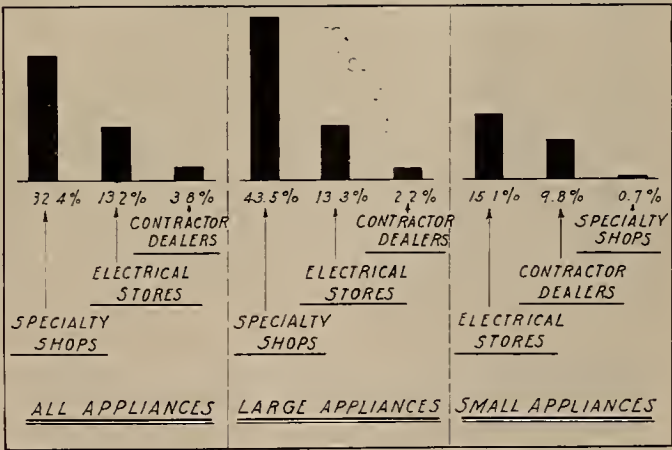


Chart showing percentage of total large and small appliance business (of all groups) done by the three types of electrical dealers.

do a small business along this line. Their attitude toward the electrical field is not particularly aggressive and they do not report any marked increase in business from year to year.

From the Wholesaler's Standpoint

The electrical dealer is the only one in this field who is buying exclusively through the electrical jobber. Department stores and household furnishing stores buy a portion of their goods from this source

—but also to some extent through other wholesale channels or direct from the manufacturer. One of the household furnishing stores does a jobbing business of its own. The hardware dealer purchases through his hardware jobber in most cases.

In explanation of the fact that hardware dealers do not as a rule make their electrical purchases through the electrical jobbing houses, many reasons were given. In the first place, the hardware man makes his other purchases through the hardware jobber and it is natural for him to follow this course. Furthermore, until recently he was compelled to get his goods in this way, as he was looked upon as outside the pale by the electrical industry and not encouraged as a customer. He states that although his purchases are now welcomed and sought after by the electrical jobber, he still feels something of the former attitude of disfavor. Specific criticisms were made by individual hardware men to the effect that the electrical wholesalers employed inexperi-

ences passes through his hands. The department store has already passed him, however, when it comes to the amount of small appliances sold. What is more, the tendency is against the electrical dealer. His business is apparently not materially increasing, whereas that reported by the other merchants at the present rate indicates that their electrical trade would be doubled at the end of four years. This condition is perhaps more apparent than real, as there is no guarantee, of course, that these relationships will continue, but it is obvious that unless something is done to counteract the present state of affairs, the electrical dealer will soon cease to be the most important factor in electrical distribution in this particular district.

Another interesting angle to the situation and one which is perhaps a corollary of the above is the prevalence of low and medium priced material sold, particularly among the smaller appliances. The large majority of the irons, toasters and percolators sold

COMPARATIVE PRICES QUOTED BY DIFFERENT RETAIL OUTLETS

	Washing Machine	Vacuum Cleaner	Ironer	Flat Iron	Curling Iron	Toaster	Percolator	Range	Waffle Iron	Air Heater
Hardware stores.....	\$154.00	\$ 60.00	\$177.30	\$ 5.12	\$ 1.78	\$ 6.81	\$ 13.70	\$175.00	\$ 10.86	\$ 8.72
Household furnishing stores.....	157.30	60.00	176.00	5.64	3.44	5.46	13.95	.....	14.57	9.40
Department stores.....	150.00	67.50	180.00	5.72	2.13	5.48	11.51	.....	15.02	6.12
Furniture stores.....	150.00	60.00	.....	5.83	5.00	7.50	14.30	175.00	14.16	9.00
Electrical dealers.....	151.10	63.00	177.40	5.53	2.50	5.71	11.88	.....	12.57	8.40
Central stations.....	.....	.....	.....	.....	.....	.....	.....	160.00	.....	.....

enced young men for their city trade and that these made infrequent visits to the trade, dropping in perhaps once every two weeks, whereas the hardware salesman was in their store at least twice a week. Moreover, it was said, the labor turnover in the ranks of the electrical group was so great that they seldom dealt with the same man twice—a situation very inconvenient to the dealer. The complaint was also made that the electrical jobber did not bother to explain the “standard package” price system to the hardware man, who, because of his unfamiliarity with the field, ordered a few less than the number required to obtain the lower price. Rather than set him right, they gave him what he ordered and charged the higher price.

There was considerable complaint on the part both of the electrical dealers and the hardware stores that the electrical jobber sold at wholesale prices to other than dealers, permitting sales to friends of employees to an extent which rendered this competition serious. The practice of the power company to sell employees at wholesale prices was also criticised by certain dealers.

Four Strong Channels

The most striking feature of the electrical retail situation in this community is the diversity of the outlets. The present situation shows four strong branches—the department store, the household furnishing store, the hardware store and the electrical dealer’s establishment. At present the electrical dealer is ahead from the standpoint of all appliances carried—and the greater part of the heavy electrical

were of the lower price scale, while probably 90 per cent of the curling irons sold were of the so-called “cheap” variety. Medium priced goods with a satisfactory guarantee were most popular. Whether this condition is due to the widened channels of merchandising and the consequent difficulty of maintaining standards or whether it is due to other local elements in the situation, it is difficult to judge.

Looking into the Future

The situation as it affects the electrical dealer is not without its witnesses and prophets—and various efforts are being made to check it. One of the power companies, for instance, has instituted regional meetings for electrical dealers to further inter-industry cooperation and to aid in improving conditions—and these are undoubtedly productive of good. The cooperative league of the community offers various helps to the dealer who is interested in better merchandising. The general feeling among the electrical group of the community, however, appears to be that electrical merchandise must be left to take such channels as it will. The former sentiment against non-electrical outlets seems to have largely evaporated—which means that if the electrical dealer is to survive as the most important factor in electrical distribution, it will be on the basis of his own achievements. The best augury for the future in this respect lies in the example of those electrical dealers in the community who are making an active financial success of their electrical appliance sales and who look confidently to an ever increasing business as a result of their own efforts in the future.

Electrifying Ogden's Water Supply

ELECTRIC power properly and scientifically applied has solved one of the important civic problems of Ogden, Utah, and has developed for that municipality a water supply which is more than sufficient to provide for its needs, both in the winter, and also the summer when lawn sprinkling and other needs bring the "peak load." Not only was this civic problem solved, but an expenditure of approximately \$700,000 for water storage facilities was averted and the delay incident to the building of a gigantic reservoir was eliminated.

This was brought about through the installation of air lifts, operated by electric power, for 27 of the municipal artesian wells at Artesian Park, a short distance from the head of Ogden Canyon. The air lift system has been in for only one season. During last summer only 125,000 kw-hr. were used, and the people of Ogden had ample water for every need. When it is considered that even 5 per cent interest on the investment in the suggested reservoir would be \$35,000 annually, and that the entire cost of the electrical installation at the wells, including machinery, motors, transformers, pipes and all material was less than \$30,000, the important saving to the municipality can be realized.

A few years ago Ogden began looking for a source of water supply that would give the people of that city plenty of good pure water. After considerable investigating it was decided that an abundant supply of pure water could be obtained by drilling artesian wells in what is now called Artesian Park. This area was then a swampy pasture, covered only with willows and tall grass.

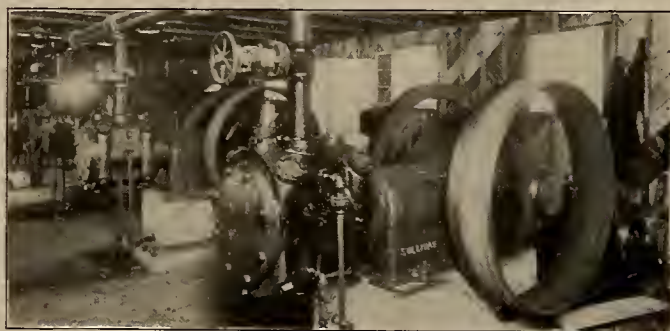
In 1915 the first well was sunk and a good flow resulted. More wells were immediately drilled and very soon these wells were supplying all the water for Ogden. Additional wells were sunk from time to time until today there are thirty-one. However, this system did not furnish sufficient water in the summer season, when a large amount of water was being used for lawn sprinkling, and factory needs also taxed the water system to capacity.

The necessity for a considerably increased water supply became very urgent, and an expenditure of approximately \$700,000 would have been necessary to erect a dam at a location known as Skull Crack in

Ogden Canyon and install a pipe line to carry the water to Ogden. It was then that electricity came to the city's aid. Engineers believed that under the lands in the vicinity of the wells is a huge subterranean reservoir.

The findings of the engineers led them to believe, after a thorough study of the situation, that if compressed air was forced into this subterranean reservoir it would cause a greater flow of water from each well and not materially lower the water level of the reservoir because of its huge capacity and its sources in the vast watershed of Ogden Valley and its surrounding mountains. Tests showed the theory to be practically correct as far as the use of compressed air is concerned.

Within a short time five 50-hp. electric motors were connected to five air compressors. Twenty-



Compressor room at Artesian Park

seven of the wells were connected to the air system. The wells are inter-connected so that any well or group of wells can be pumped by any one of the units. The installation when completed proved to be a great success, the flow being increased to 22 sec.-ft. of water. The air system, for the present at least, will only be used during the summer season, when a much greater supply of water is needed.

During the past summer concrete basins were installed, transforming each of the wells into a beautiful fountain. The wells, each sending forth a spray of water to a height of 4 or 5 ft. in their concrete bowls, have greatly added to the scenic beauty of the canyon.



Partial view of the artesian well field in which electricity is playing an important part in forcing the water to the surface.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

IN the preceding issue was presented a concise description of the columnar headings of the combined cash book-journal and the use of its various columns. As this book appears to be the master key to the entire bookkeeping system, it seems sufficient to be noted that, as previously mentioned, the total of the debit columns equals the total of the credit columns at the end of this page which has also been considered, for illustrative purposes, as the end of the month. The small numerals appearing under the

COMBINED CASH BOOK - JOURNAL										MONTH OF MARCH, 1921.									
- BANK -					DATE	DESCRIPTION	CASH NO.	Accounts Receivable		Accounts Payable									
Balance	Deposits	Checks Paid	Other	Draw				DR	CR	DR	CR								
1	543.25				1	Balance In Bank													1
2				75.00		Real Estate Agency - Rent - 1/2 mo 19	145												2
3				87.00		Am. Ry. Express Co	146												3
4						Home Builders Inc. - 110 Main St. - Job No. 5		1546.50											4
5		1426.00				J. H. Smith - 1464 Ave.			1426.00										5
6	613.50					Cash Sales													6
7					3	Electrical Supply Co. - Dr. 1/2 mo											1678.00		7
8						J. S. Jones - 301 B. St.		37.50											8
9						R. H. Williams - 165 C. St.			72.50										9
10				6.00		Motor Vehicle Rep. - Auto Service	147												10
11	674.95					Cash Sales													11
12					8	Pay Roll	148												12
13				50.00		Proportion	149												13
14						C. E. Adams - 120 D. St.													14
15	641.95					Cash Sales													15
16					10	Electrical Supply Co.	150												16
17						Washing Machine Co.	151												17
18						Vacuum Cleaner Co.	152												18
19						A. S. Johnson - 162 Main St. - Job No. 5		3526.00											19
20						Cash Sales													20
21					15	F. K. Anderson - 1250 Ave.													21
22						Telephone Co. - 1250 Ave. - 1/2 mo 72	153												22
23						Power Co. - 1250 Ave. - 1/2 mo	154												23
24						Pay Roll	155												24
25						Proportion	156												25
26						Cash Sales													26
27	327.90				25	Washing Machine Co. - Dr. 1/2 mo												1426.00	27
28						Vacuum Cleaner Co. - " 1/2 mo												751.50	28
29						Anderson - 140 B. St.			175.00										29
30						Cash Sales													30
31					31	Oil Supply Co. - 1250 Ave.													31
32						Power Co. - " 1/2 mo													32
33						Auto Repair Co. - " 1/2 mo													33
34						Proportion - " 1/2 mo													34
35						Petty Cash - " 1/2 mo	157												35
36								1626.95	938.40	420.95	4166.00								36

Sample pages from combined cash book-

ciently important at this time to present a practical illustration of the use of the form.

The entries contained in this sample page, although fictitious ones, are identical with the transactions occurring daily in every electrical store. It totals of each column refer to the chart of account numbers in the general ledger to which these monthly totals have been posted, either to the debit or credit as designated at the top of the page. No numerals appear under the Sundries Dr. and Cr. col-

umns as the amounts entered in these columns have been posted in detail to the proper accounts in the general ledger as shown in the description space on the same lines with these entries.

The form as it stands below in most instances affords sufficient columnar space to facilitate the postings into the general ledger as the headings outlined represent the accounts to which there are enough entries during each month to warrant providing a special column. However, if it is discovered that any accounts for which special columns have not been provided are being affected to an extent that would cause too much detail posting from the sundries columns, this feature can be taken care of very easily through the insertion of a flyleaf that

much detailed analysis as the size of the business warrants. These are found especially adaptable in larger stores where departmental analysis of sales and costs is required, this phase to be taken up later.

In the small store where the charge sales transactions are not very numerous, the charges to customers can be entered in detail as shown on the sample chart, but when the charge sales are more numerous it becomes too laborious to enter each charge separately in the Cash Book-Journal and the same result is obtained by making one entry daily for the total charge sales—jobs and stores, the postings to the accounts receivable ledger being made direct from the charge slips. The same rule applies to the entry of invoices for merchandise purchased,

SALES		MERCHANDISE	LABOR	ADVERTISING	Freight, Rental Express	INTEREST	DISCOUNT	SALARIES	Perman. Accr.	SUNDRIES			
Job	Store	DR	DR	DR	DR	DR	CR	DR	DR	DR	CR		
1												1	
2												2	
3											7500	3	
4	15465					570						4	
5												5	
6			825									6	
7			16780									7	
8			3750									8	
9							45					9	
10					600							10	
11			540									11	
12				26145				2500				12	
13									5000			13	
14												14	
15			2860									15	
16								450				16	
17								770				17	
18								125				18	
19	35260											19	
20			1025									20	
21												21	
22											960	22	
23												23	
24				15335				2500				24	
25									5000			25	
26			5270									26	
27			14260									27	
28			7835									28	
29												29	
30			1065									30	
31					2840							31	
32											980	32	
33					1460							33	
34								5000			5000	34	
35			670		535	1265						35	
36	59945	15365	37045	41480	5435	1835	45	515	25000	10000	9445	50000	36
	50	50	10	11	6	6	6	40	4				

journal showing the use of columns.

contains four amount columns on each side, or a total of eight additional columns available for further account headings. Any number of these flyleaves can be conveniently inserted as desired so that the book is subject to the necessary expansion to furnish as

which can be accumulated on file, checked against the monthly statements when received and an entry made in the cash book-journal under date of the end of the month for the total of the monthly purchases from each firm.



Live Wires and Their Relation to Live Wiremen

By G. E. KIMBALL

Engineer, Electrical Division, Department of Safety,
California Industrial Accident Commission

Years ago, one of the first electric roads in this country was built between two towns in northern New York State. There was a great commotion throughout the rural district when the plan was first proposed and much speculation as to what might happen. That the road would be very dangerous was a foregone conclusion, for it stood to reason that tremendous power would have to be developed to drive a single car, weighing more than a ton very likely, much less a number of cars loaded with people. Was it reasonable to believe that so much electricity could be carried through the streets on wires without great danger to the public?

It was reported that these terribly dangerous wires were to be stretched over the streets where the road passed through town, just high enough to miss the circus wagons in a parade, and how any farmer would be able to deliver a load of hay to the livery stables in the village if he could not drive down the main street without being killed, was more than some people could figure.

The farmers in that particular district had not fully accustomed themselves to the occasional loss of a cow or a sheep on the recently completed steam railroad, so that when it was rumored the electric cars might attain a speed as high as 20 miles an hour between towns there was a downright uneasiness among those who were located near the track, combined with a natural feeling of doubt regarding the ability of the new road to pay damages.

Shortly after the road was electrified to operate construction cars, the weekly paper came out with a vivid story relating in detail how a horse, which was being driven across the car tracks by a farmer, was instantly killed when it stepped on one of the rails, and how, fortunately, the driver remaining in his seat (too frightened to move, probably), was spared a like fate when his wagon was drawn to a safe place by the track workmen. The skeptics surely had their inning for a time and the "I told you so—it can't be done" crowd had the best of the argument for a while.

The week which followed was a long one for all who were watching and waiting for the next issue of the paper. It was confidently expected by many that there would be a number of people and horses killed in the meantime, so when the paper did finally arrive with no further casualties reported, it was a surprise to many. Instead, the officials

of the traction company submitted an article in explanation of the affair which assured the public that, since the track bonding had been completed, there was no possibility of a similar accident in the future.

This only covered one angle of the case, though, and many were the wild and fanciful stories circulated. One, that created quite a disturbance among the farmers, was to the effect that many dead sparrows, robins, meadowlarks, and other wild birds had been found all along the traction company's right-of-way, at all locations where the electricity had been turned on. The poor birds had been killed, it was reported, when they stopped to rest a moment on the trolley wire. What did the future hold for bird life in America, if such wholesale slaughter was permitted to continue indefinitely? The real dark side of the story was revealed, when it was reported that the foxy crows and blackbirds, noted for their crop destroying propensities, were carefully avoiding the live wires with the inevitable result that all of the insect eating friends of the farmer would eventually be killed, and his crop destroying enemies would remain to make his already hard lot very much harder.

Another rumor was to the effect that all the new electric cars which had been purchased for use on the line would have to be sent back to the manufacturer, because a mistake had been made in using metal for the car steps and handles. This must certainly be dangerous, for would not metal handles attract electricity from the trolley wire exactly the same way as lightning arresters, which had been placed on a number of barns in the country, were expected to attract lightning from the clouds?

The work was finally completed and the officials of the road were opening the line with quite a little ceremony. The streets were lined with people to see the first cars go by, but at the start they were not crowding and pushing to climb aboard for their first ride. The first car to leave the barn was well crowded with officials of the traction company and their friends. In the second car a brass band took up most of the space, but the cars which followed were not so well loaded. Everyone seemed to be waiting for somebody else to go first, or for something to happen.

In the crowd that day was a small boy, barefooted and comfortably dirty.

Like the average American boy, who is never satisfied to watch a ball game or circus parade from the ground, he looked around for a lofty place to perch. Seeing no better place, he "shinnied" up one of the traction company's poles which supported a 600-volt feeder and one of the span wires. Seating himself on the feeder cable, he leaned back against the pole, put both feet on the span wire and there he was, very comfortably seated, when the first car came along. He was entirely unconscious of the commotion and near panic which he had created and was only intent on seeing all there was to be seen. Nearly everyone thought he would be killed and could not understand why it did not happen instantly. When the superintendent of the road, apparently not a bit worried about the danger to the boy, waved his hand and smiled, the crowd began to suspect that possibly all they had heard about some "live wires" might not be true. The fact that the boy was not killed must have reassured a great many to the point of confidence for immediately after that a number climbed aboard the cars, some without touching the brass handles, it is true, and the road was happily launched on a successful career. The boy on the pole was certainly lucky that the insulation on the feeder cable was new and that the span wire insulators were good.

I have heard the expression "live wires" a great many times since those days. It is an expression which very effectively conveys a warning of danger and should not be entirely lost or forgotten. In teaching children to avoid dangerous electrical circuits, there is no other term which seems to take its place and make the required impression so well.

Within buildings, where electrical contractors are responsible for the installation of electrical conductors, wiring methods have so changed within the last few years that there are not now many places where live wires are exposed. With the use of conduit, enclosed switches, wiring gutters, and metal cabinets, the current-carrying parts have been so effectively enclosed, that there are now a great many installations where no electrical conductors are exposed to accidental contact at any point within the building.

In the process of transition, from the old open wiring methods to the modern completely enclosed installation, there have been a great many changes in methods of construction. These changes have kept those engaged in installing electrical equipment continually studying and changing their methods to adapt themselves to the new conditions.

The old-time electrician, who could make his living with a hammer, screw driver, and a pair of pliers, finds that type of workmen in a class which has been relegated to the scrap heap. A pair of 6-in. pliers will not cut off 2-in. conduit, nor can they be used for cutting threads on the end of a pipe.

Electrical contractors are not to be blamed entirely, for the varied styles and classes of electrical installations which were put in during this change-over period, for it is true that the rules regulating such work did not keep pace with the new methods and with the new material and devices which were introduced. The new National Electrical Code and the new Electrical Safety Orders should make it possible to better standardize on electrical installations so that, regardless of what electrical contractor may do the work, the completed job should vary but little from an installation made by another electrical contractor.

With these new rules and orders as a basis, it should also be possible for a more complete understanding and for better cooperation between inspection departments and those who are making electrical installations.

It cannot be hoped, even with the most approved installations, that electrical accidents will be entirely eliminated. Even among electricians who are entirely familiar with the hazards involved, there are the usual number of accidents. This would show that live wires are absolutely impartial and will exact the same toll from the careless or thoughtless, that they do from the ignorant or uninformed. Hardly a day goes by that there is not a report received by the Industrial Accident Commission, of an accident to an electrical worker. The most frequently reported accidents on low voltage, are from flashes and burns. Often a case of temporary blindness is reported due to a flash in the face. This frequently occurs when an electrician or helper places a low voltage lamp across a higher potential circuit, with the result that the lamp and socket are exploded and a burn is received.

Electricians making electrical equipment safe for others to operate, often lose sight of the fact that within the enclosures provided to guard live parts, there are current-carrying parts which are dangerous. Working on live electrical equipment, with grounded metal cases, is far more dangerous to the electrician than it was in the olden days when switches and cutouts were exposed and easily accessible.

Moral: It is extremely difficult for a physician to get members of his own family to take medicine which he prescribes, but that does not signify his remedies are any the less efficacious. Employers of electrical workmen should insist that their men observe all of the rules for safety which they would prescribe for others, for electrical energy properly handled is safe and every man in the electrical business owes this much to the industry. He should see that it is always used under the safest possible conditions.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following receipt of the inquiry.

Question: How should lease contracts questioned be handled on the books?

Answer: Take for example a washing machine carrying a cash selling price of \$135 and which is sold for \$145 on lease contract, payable \$13 down and \$11 per month for twelve months.

The first entry should be to debit the customer (accounts receivable) with \$145; credit sales account with \$135, list selling price, and interest account with \$10,—the carrying charge. The down payment of \$13 is debited to cash account and credited to the customer's account. The contract is then discounted, the discount corporation withholding 10 per cent of the \$132 balance, or \$13.20, until completion of the contract, and deducting \$10,—the same amount that has been added to the list selling price as a carrying charge. The dealer receives a check for \$108.80.

The proper entries for this check are as follows:

	Dr.	Cr.
Cash account—net amount of check	\$108.80	
Interest account—carrying charge	10.00	
Discount corporation—10 per cent withheld	13.20	
Discount corporation—Total bal. of contract		\$132.00

As the monthly payments are received the customer's account is credited and the discount corporation's account is debited when payment is sent to them monthly by the dealer. When the contract is fully paid the dealer receives a check for \$13.20 from the discount corporation covering the 10 per cent withheld, which is credited to and closes their account.

Cooperative Fan Motor Program Undertaken by S. E. D.

The Fan Motor Section of the Associated Manufacturers of Electrical Supplies in cooperation with The Society for Electrical Development has undertaken a cooperative fan motor promotional program designed to emphasize the diversified uses of electric fans.

In general the activity provides for the dissemination of informative items, chiefly regarding the non-summer uses of the electric fan. Among the diversified applications of the fan are:

1. To stimulate radiation in cold rooms with hot-air and hot-water heating and to induce circulation in hot-air furnaces.
2. To increase draft in furnace.
3. To speed up the drying of freshly varnished furniture or floors.
4. To speed up the drying of laundry.
5. To aerate the refrigerator after it has been cleaned.
6. To dehydrate fruits and vegetables.
7. To dry white shoes after cleaning.
8. To dry hair quickly.
9. To cool and ventilate the kitchen.
10. To supply fresh air service to the home and place of business.

Special Regulations Issued by Denver City Electrician

Dispatches from Denver, Colo., several weeks ago indicated that the city electrical inspection department was formulating a number of improvements looking towards a revision of local electrical ordinances. C. F. Oehmler, head of the department, has classified a number of these changes into special rules which have just been announced to the industry in Denver. Most of the rules became effective upon the publication of the announcement.

Following are the principal emergency instructions:

1. All main line service switches must be installed inside of building. Outside installations only by special permission from City Electrician.
2. B. X. will not be permitted to be installed on surface of ceilings or walls or imbedded in brick walls.
3. All wiring in signs must be coded. Black wire to shell side of sockets.
- †4. All outlets in kitchen and laundries must be wired on one circuit of No. 12 wire. Wires of other circuits will not be permitted in these conduits.
- †5. All cabinets over 4 circuits must be of the guttered type. It will not be permissible to install a series of cabinets to avoid installing the required guttered type cabinets.
- †6. All feeders larger than No. 6 wire feeding through cutouts must be bus bars.
7. 1,000 watts will be allowed on a circuit of No. 14 wire instead of 660 watts.
8. All center outlets in living room, dining room, 200-watt. Brackets, music room, dens, bedrooms, billiard rooms, sunroom and all base plugs other than kitchen, 100 watts.
- †9. Apartment houses same as new houses, except kitchens, 660 watts, No. 14 wire.
- †10. When old houses have laundry, the same rule applies as to new construction.
- †11. Where there are no laundries one circuit of No. 14 with 1,000 watts will be permitted in kitchens.
- †12. Coded wire will be required on all jobs.
13. Switches of any type will not be permitted to be installed on ceilings or walls in buildings where they cannot be operated by hand.
14. All pull boxes used on outside construction must be galvanized slope top.
15. Bare ground wire will not be permitted. Ground wire must be run in conduit to water pipe. Three-fourths-in. conduit may be run to first outlet in basement, pulling circuit wires and one No. 8 ground wire through outlet. One-half-in. conduit from this outlet to within 6 in. of water pipe. Larger ground wires and conduit in proportion.
- *16. All electrical contractors will submit to city electrician at the time of applying for a permit, a complete wiring plan with schedule of all feeders and branch circuits, and obtain his approval before work on the installation is commenced. This rule will apply to all jobs requiring a main switch larger than 30 amps.

The screw type of base plug receptacles will be discontinued on and after July 1, 1924.

†Effective 30 days from date.

*Effective May 1, 1924.

Excellent Business During 1923 Reported by the People's Electric Company of Medford, Ore.—According to O. O. Allenderfer, one of the partners in the company, the gross sales during the past year were in excess of \$100,000 and the company is preparing for \$120,000 worth of business in 1924. Electric range sales averaged 10 per month throughout the year and Mr. Allenderfer reports a large volume of appliance sales. Industrial activity in the Medford district during the year was marked and several fair-sized sawmill and other installations were made. This activity has not diminished and during the past month the company installed approximately 500 hp. in new motors in industrial plants in and around Medford.

[Editor's Note.—This address was presented at the quarterly meeting of the California State Association of Electrical Contractors and Dealers, Stockton, Calif., March 15, 1924.]

JOBBER, DEALER AND SALES AGENT



Private Electric Homes Sell Electrical Merchandise

Sacramento Electrical Industry Finds that Users of Electricity Are Best Carriers of the Electrical Message

By ROY N. PHELAN

Probably the biggest talking point for the use of electricity in the home is the satisfaction that is expressed by everyone that is using it to lessen the drudgery of housework. From the woman's point of view, testimonials of satisfied users are facts upon which she can rely and upon which she can base her judgment. If the average housewife sees that her neighbor is using an electric range and is a steady booster for it, she knows that the woman using the electric range has no ulterior motive in telling the advantages of cooking by electricity and is, as a result, interested in the operation of the modern device.

It is for this reason that the electrical salesman is always anxious to have his prospects call upon persons that have been using electrical devices for some time. He is not afraid to allow his prospect to compare notes with old users of electricity for he knows that if the housewife is informed in the operation of the equipment that she is using, she will be a booster for it and an ally in making the sale.

In Sacramento, Calif., the people that

support electricity the most are those that have their homes so completely equipped with electrical conveniences and necessities that they could be used as display homes to show how a modern home should be equipped. The electrical industry in that city has been active in promoting the electrification of these homes and is proud of the forward steps that have been taken by individual home owners. In addition to this, the owners of the electric homes have been ready at all times to tell their friends and neighbors of the advantages of using electricity with the result that much additional business has been secured by the electrical industry there.

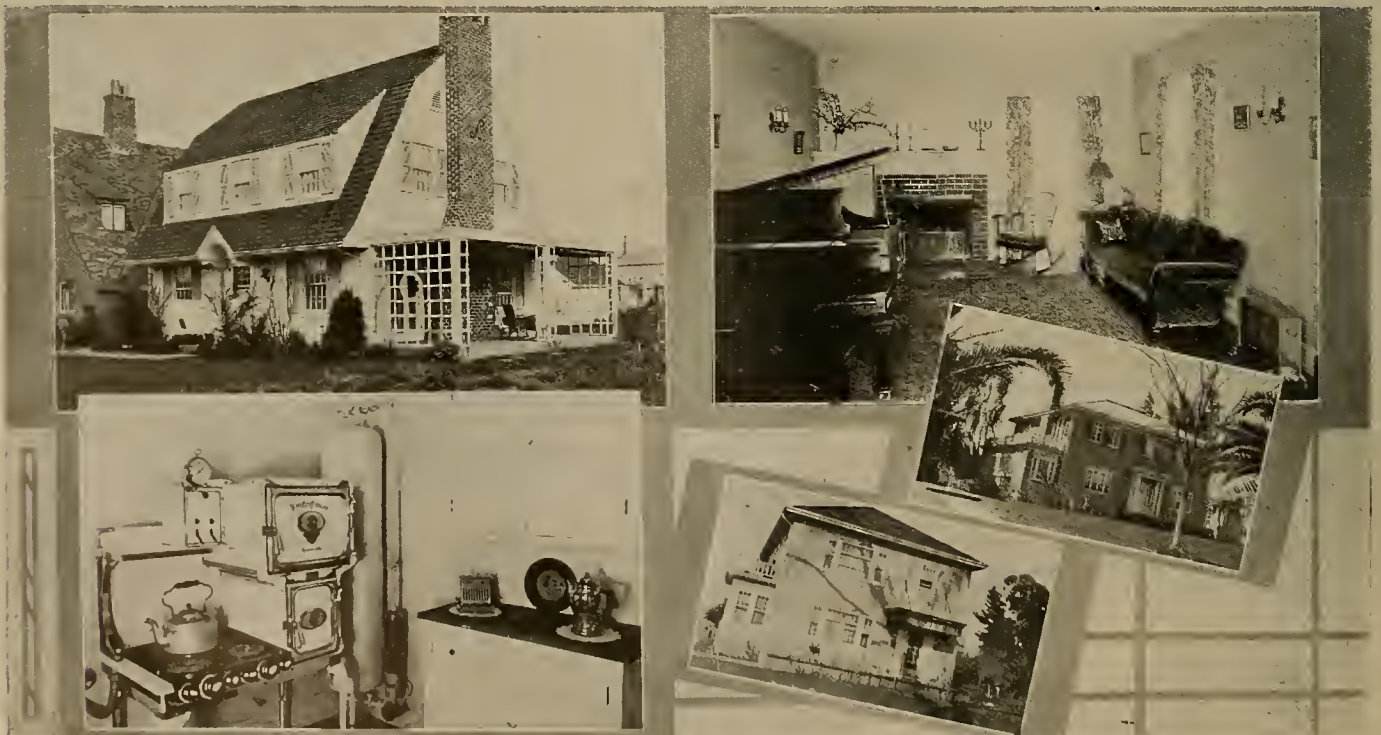
One of the first homes in Sacramento to be completely electrified is that of Roy W. Blair. It is a home of the colonial type and was designed by the architectural firm of Dean & Dean. The home was selected as one of the most attractive and modern ones in the city by the Sacramento Chamber of Commerce and will be entered in the statewide competition that is to be conducted

by the Chambers of Commerce of California.

The home is equipped with electric range, water heater and with a large number of air heaters. Electrical appliances are also used to lessen the amount of housework that must be done manually. The electrical installation was made by Latourrette-Fical Company of Sacramento. F. W. Davis of the Great Western Power Company was in a large way responsible for the electrification of this and many other homes in Sacramento.

The homes of Mrs. Bessie M. Bassler and of A. D. Fenton are also examples that show how electricity makes a home livable. Careful attention was paid to the electrical installation in each of these homes with the result that the beauty of the interiors has been greatly increased and considerable labor has been saved for the housewife.

Since these three homes have been electrified, other residents of Sacramento have heard of the results that the owners of the homes have had with electrical equipment. The story has traveled fast and other homes have been electrified. Apartment houses have also been equipped with electrical devices and appliances, consequently more satisfied users have been added to the list of persons who are enjoying electrical installations.



Three of Sacramento's electrified homes are shown above. The owners of these homes are assisting the industry to electrify other residences.

Making the Advertisement Appeal to the Customer

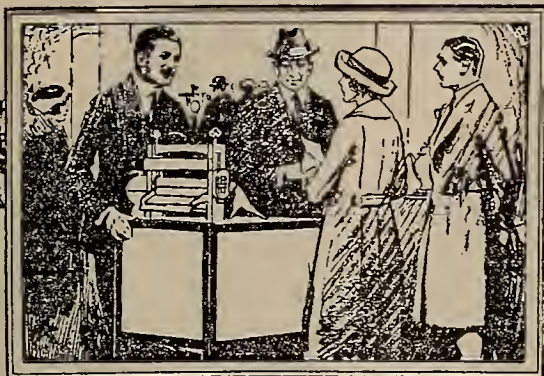
Artistic Layouts Will Attract the Eye of the Woman That Is in Search of Things to Beautify Her Home

By VIRGINIA CALDWELL

When does electrical advertising appeal to women? Is there one kind that is more effective than another?

This question of advertising to women has been studied by Miss Ruth Seymour, a member of the advertising

tic. Your advertisement, in black and white, can be artistic, for good advertisements are achieved by attractive cuts; a balanced layout; a type face that is appropriate; a border in keeping with the size and contents of



"THE VERY THING FOR MOTHER"

YOU know how it goes every year! You ask Mother what she wants for Christmas and usually she says—"Oh, anything children, just anything—don't spend very much!" But deep down in her dear, unselfish heart she may secretly long for some plain, practical, labor-saving device that won't seem a bit like a Christmas gift to you, perhaps, but to her will mean complete freedom from the tedious washday tasks, that slowly sap her strength, her energy, her youth.

Consider Her Comfort—Save Her Strength!

Electric Washers

For no more than you'd pay for some comparatively trifling present, this big, generous, helpful and thoughtful gift is delivered to Mother. Small monthly sums thereafter added to your electric light bills.

Delivery of washer made at any time you specify.

Phone 200



The pen and ink illustration used by the Puget Sound Power & Light Company attracts attention because white space surrounds the picture and the advertising copy.

department of the Honolulu Star Bulletin, whose training in New York has enabled her to turn out some effective copy. She says that the question should be given thought by merchants inasmuch as the woman is the buyer of the family.

In answer to the question she says, "One must consider certain qualities said to be more characteristic of women than of men. One of these is the artistic quality or aesthetic sense.

"Therefore, if you want women to read your advertisement make it artis-

tic. The illustration is the first thing to take the eye, but its pulling power will be greatly decreased unless it is given the proper amount of white space, and is used in conjunction with the right size and kind of type. White space properly used gives quality to an advertisement. Careful attention should also be paid to the border that is used."

The light-faced borders and type used in the accompanying advertisement of

An Electric Gift

Will be Appreciated
From Year's End to Year's End

Timely Suggestions

Christmas winds make an electric heater appropriate. An electric waffle iron is always welcome. Or how about a new percolator and grill set on the table for the wife on Christmas morning?

An electric curling iron or an immersion heater makes a welcome addition to any toilet outfit.

You will also find in our store the best of washing machines and all household electric equipment. Christmas or other times we are always handy and always at your service.

Coronado Electric Shop

1007 Orange Ave.

Phone Coronado 624

The Coronado Electric Shop uses light-faced type and borders to give the artistic effect to this advertisement.

the Coronado Electric Shop, Coronado, Calif., are pleasing. This display is restrained and although the copy shown is for Christmas time the design can be used effectively at any time.

Cuts, border and the trademark are effectively combined in the advertisement of the Puget Sound Power & Light Company of Seattle, Wash. This, too, is Christmas advertising but the argument of saving mother is a good

We Can't Run Away

Why not take advantage of that fact?



A FEW DAYS AGO a woman asked our assistance in repairing a certain electric appliance.

It was an inferior appliance. It had been sold to her by a salesman who burst into town, "worked fast" and disappeared.

There was no one to reimburse her, on one to make proper adjustment.

A local merchant would not have sold her that inferior appliance. This company—both submit, all types of appliances to careful tests—could not have sold her that appliance.

And if we had, by error, she could have found us—like your other local merchants—right here in town, ready and willing to rectify that error.

If you haven't an electric vacuum cleaner, you aren't taking full advantage of your electric services. Are you bring a Furber vacuum cleaner to your home and allow your floor to water your time, your strength, your health. An obligation whatever for the demonstration.

Portland Railway, Light and Power Co.

237 N. Liberty St.

Phone 85

Salem, Oregon

Bold face type is used by the Portland Railway, Light & Power Company to secure emphasis.

one at other times, too—and Mothers' Day is nearing. Note that white space is evenly distributed here.

The Salem, Ore., office of the Portland Railway, Light & Power Company had something it wanted to say in a strong and emphatic manner, about itinerant appliance salesmen who "worked fast" and then left town. Using strong but not too heavy type was consistent. Each type face has its use and after the character of the advertisement has been set a suitable type face can be selected to present the message.



Seven electrical concerns participated in the Seattle Modern Homes Exposition and the model bungalow was completely electrified.

Electrical Devices and the Better Homes Show

Seattle Concerns Show Public Necessity of Electrifying Homes to Make Them Come Up to Present Day Standards

Seattle's Modern Homes Exposition which held the public's attention in that city for a week, late last fall, was made possible by realtors, men of the electrical industry, master plumbers and heating contractors, general contractors, manufacturers and merchants distributing household equipment, appliances and furniture. These men by devoting nearly two months of their time and expending no inconsiderable amount of money, assured for Seattle an annual Modern Homes Exposition, where home builders and firms distributing home appliances and furnishings may exhibit and demonstrate to home owners and prospective home builders.

Seattle's exposition, held in the new Terminal Sales Building, First Avenue and Virginia Street, though fostered by the realtors, was not a real estate venture. Rather, it was a community project for the betterment of home conditions—tending to encourage home owning, home building and home furnishing. To avoid even the appearance of direct profit to the realtors, exhibits by real estate firms were barred from the exposition, the realtors combining

in one official booth which was maintained for the information of exposition visitors rather than for exploitation of the real estate business.

The exposition is a part of the national movement to increase home ownership and improve citizenship throughout the United States, inaugurated several years ago by Secretary of Commerce Herbert Hoover and vigorously pushed by a bureau of the federal government. The National Association of Realty Boards has been cooperating with the government in the movement and has sponsored home expositions in a number of cities, of which Seattle is the latest. Portland, to date, has held three annual home expositions and plans, it is understood, continuing the practice.

Interest of the thousands who visited the show centered around the model bungalow, the contribution of John L. Hall, chairman of the executive committee, and of other individuals and firms who donated materials and equipment used in the bungalow. This home, constructed on the main floor of the Terminal Sales Building, was a five-

room bungalow, 40x38 ft. in size. Throughout, it was the last word in up-to-the-minute small house design and appointment, especial attention being given to the electrical installation and equipment.

The booths of the various exhibitors were located on the second and third floors of the Terminal Building. Ninety-three exhibitors in all utilized space where various household equipment and appliances were demonstrated. No sales efforts were permitted but, despite this ruling, it was stated that numerous orders were placed by interested spectators following demonstrations of the equipment on display.

Extra large space was afforded the exhibits of the Puget Sound Power & Light Company and the City of Seattle's Lighting Department and these exhibits were especially attractive. In the municipal plant's booth, much space was given over to displays of colored views, showing construction at the Skagit power project, also some views of the Skagit River country.

Aside from the exhibits of the Puget Sound Power & Light Company and the City of Seattle, five electrical dealers, distributors of fixtures, appliances and electrical equipment, maintained tastefully decorated and attractively equipped booths.

Community Electrical Exhibits to Be Subject of Plan

Based upon the experience gained by The Edison Electric Illuminating Company of Boston, Mass., in the conduct of community electrical exhibits, the Society for Electrical Development has prepared a preliminary draft of a plan to assist in the organizing and conducting of such exhibits. After refinement, this plan will be made available to electrical leagues and other local cooperative organizations and individual companies at a nominal charge.

As an experiment, the society has also obtained certain standard equipment which it is making available at a rental charge to central stations throughout the New England States. This work is being carried out in cooperation with the contact bureau of the New England Section, National Electric Light Association. Already, four community electrical exhibits are planned at which this standard equipment will be used.

Manufacturer Publishes Book on Modern Lighting Design

A publication of value to illuminating engineers and architects in drawing up plans for ornamental exterior lighting is being distributed by the Westinghouse Electric & Manufacturing Company. The publication is entitled "Ornamental Brackets, Newels and Lanterns."

A great number and variety of exterior lighting units, artistically designed for use in the illumination of entrances and facades of public buildings, the gateways of residences and private grounds, and the passage-ways of bridges and viaducts, are included in this publication. With the requirements of the architect particularly in mind, an excess of descriptive matter has been dispensed with, yet each unit is so adequately presented that its adaptability for a particular installation can be readily determined. For every type of fixture included in the booklet, a photograph and a dimensional

drawing are provided, together with a brief description. Views of actual installations of many of the units are also contained.

These paragraphs from the foreword to the publication indicate the purpose for which it is issued:

"Modern lighting science has made it possible for the architect or illuminating engineer to retain the decorative motifs of the early centuries in combination with the most efficient equipment for distributing light.

"Effectiveness in a lighting unit is a happy combination of lamp, glassware and light control. Efficiency need not be sacrificed to secure an artistic luminaire; in fact, the more ornate designs usually permit the inclusion of scientific equipment as readily as the simpler types."

Camp Cooperation IV to Be Held Sept. 2-6.—The next conference of representatives of local electrical cooperative organizations will be held at Association Island, Henderson Harbor, N. Y., Sept. 2-6. The Society for Electrical Development, which is sponsoring this meeting, has notified electrical leagues and other local cooperative organizations of the above dates.

Harvey Hubbell, Inc., Bridgeport, Conn., has placed on the market a new pull chain extender for kitchen units. This device is equipped with a pull cord of suitable length and prevents the receptacle pull chain from chafing or jarring the glass fixture bowl.

DISCONTENT CLASSIFIED—WHICH AFFLICTS YOU?

By JOE OSIER

"There are two kinds of discontent in this world; the discontent that works, and the discontent that wrings its hands."

What kind are you afflicted with? Have you the sort of discontent that makes you try again—that drives you

to your offices early and causes you to stay late—that bids you forego philandering and fumadiddles—that causes you to plan and work unceasingly to make your plans succeed—or

Have you the discontent that causes you to throw up your hands and quit cold, as a Norwegian well digger, when you strike hardpan?

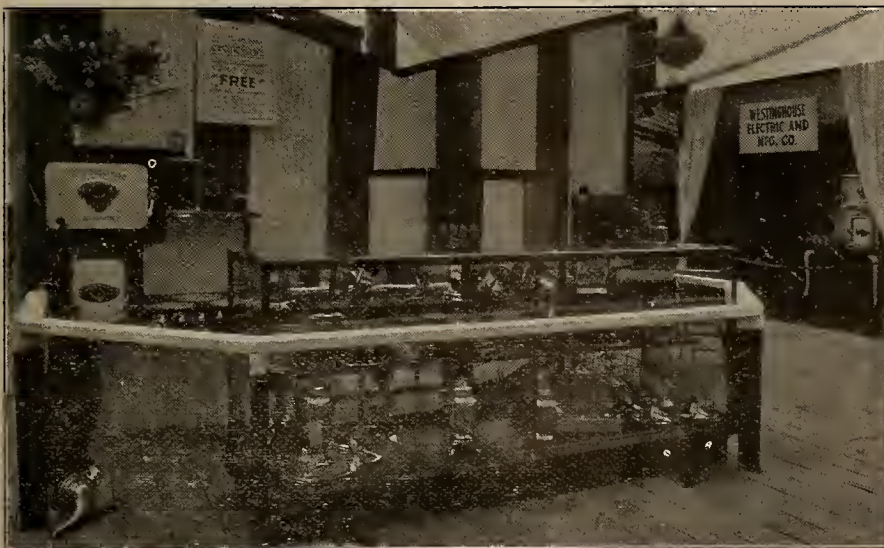
History will tell us, probably, that Henry Ford was the King of Discontent and that he persisted in being discontented until there were one hundred and ten million flivvers fitting about the highways and alleys of the United States.—and

History will also record, undoubtedly, that discontent caused Jack Dempsey to crawl from beneath a box car and go gunning for the scalps of Carpentier, Gibbons, Firpo, et al.

Divine discontent is the thing that makes millions out of first dollars—plutes out of paupers and financiers out of fizzles.



Facts and Guesswork



A satisfactory means of displaying prizes awarded in connection with an electric home essay contest was employed by a Western newspaper recently. The prizes, consisting of both large and small electrical appliances, were arranged in one of the booths at an exposition that was being conducted in connection with

the essay contest. The smaller appliances were attractively arranged in a full glass show case and the larger devices were set farther back in the booth. The arrangement made it unnecessary for an attendant to be on hand to see that the prizes were not molested by the visiting public in attendance at the exposition.

Those that heed the admonitions of discontent and wrestle mightily with it, see their names on the front page while those that conduct themselves to the contrary—

Seldom can be found, even in the classified section.

As a man of the electrical fraternity, how are you sitting? Are you satisfied with your business, with your volume, with your reputation, with your prospects for the future?

Or are you discontented? Would you like a better location, a better class of trade, more volume and prospects which extend to the horizon of your vision?

If the latter boot fits your bunion, you are on the highroad to success and the traffic signals, each and every one,—Are marked "Go."

But if you are satisfied, you might as well call a meeting of your creditors—give them cents on the dollar and—

Begin again.

This much is true: The discontented ones usually come under the wire winners while those that wring their hands lose what advantage they may have gained.

INDUSTRIAL NEWS



Colorado Springs Bond Election Postponed Two Weeks

Due to delay in final passage of the ordinance authorizing submission to the taxpayers of Colorado Springs, Colo., of the proposition of a \$1,250,000 bond issue for a municipal electric light plant, the election originally planned for May 6 has been postponed until May 20 so as to permit of the necessary legal advertising required preparatory to such an election. When the final reading of the ordinance was approved by the city council, it is understood that the legal verbiage of the instrument referred to the water rights of the city and their immediate development, although the report by Franklin Wood, consulting engineer of Denver, on which the proposed bond issue is based, included as one of the main items an appropriation for nearly a half-million dollars for a steam generating plant and necessary transmission lines.

Sentiment on the municipal ownership proposition is rapidly changing, judging by the results a citizens' committee, headed by former Governor O. H. Shoup, has obtained since the inception of the committee early in April. It is said that 250 business and professional men of the city are opposing the city council's proposition in such a way that there is now an even chance of municipal ownership being defeated.

Colorado Springs papers have questioned the sincerity of the council's report on the issue and charge that the council is attempting to mislead the taxpaying electors of the city. This is occasioned by the fact that the council premises its report on the recommendation of the late George Anderson, which concerned only water problems whereas the funds requested are based on the Wood survey which primarily concerned the necessity of having a steam stand-by plant.

Bill Proposes Five Amendments to Federal Power Act

Five amendments to the Federal Water Power Act are proposed in a bill which has been introduced in the Upper House of Congress by Senator Jones, the chairman of the Committee on Commerce—the committee having jurisdiction over water-power legislation.

The first of these amendments provides that the Federal Power Commission may employ its own personnel rather than borrow employees from the War, Interior and Agricultural Departments, who are paid out of the appropriations of those departments. The second amendment provides for placing in the Commission the sole authority to issue licenses for power developments

and to conduct investigations with respect to them. The third amendment would empower the Commission to take jurisdiction over permits and licenses issued under legislation prior to the passage of the water-power act. The fourth amendment proposed would make available for administrative expenses the actual moneys collected for that purpose. The fifth amendment makes provision for a more complete utilization of lands withdrawn as power-site reserves.

The bill was introduced at the request of the Federal Power Commission. Secretaries Weeks, Work and Wallace recently joined in a statement calling attention to the need for these amendments.

California Water and Power Act Identical with 1922 Bill

Circulation of initiative petitions for the California Water and Power Act, similar in every respect to the bill proposed in 1922, began in cities in California on April 8, 1924. The measure is practically identical with the 1922 bill, authorizing the issuance of \$500,000,000 in bonds and placing almost unlimited powers in the hands of a committee of five men to be appointed by the governor.

The Water and Power Act was one of the most hotly contested measures on the 1922 ballot. It was defeated by a vote of 536,624 to 239,524 or almost 2.25 to 1.

The bill carries a new short title. It has been summarized by the attorney-general as follows:

Water and Power. Initiative measure adding Article XIVa to the Constitution. Creates board, appointed by Governor and subject to recall, authorized to develop and distribute water and electric energy, acquire by any legal means any property therefor and to do anything convenient thereto, including using and reserving state lands and waters; gives state and political subdivisions certain preferential rights as against privately owned public utilities selling water and electric energy to public; authorizes issuance of bonds not exceeding \$500,000,000 to further such purposes, requiring board to fix rates to meet expenses and retire bonds in fifty years.

It will require 77,263 certified signatures to the initiative petition to put the measure on the November ballot. Under the present laws the certified petition must be in the hands of the Secretary of State 90 days before election or not later than Aug. 6, 1924. Twenty days are required by county clerks for checking the signatures, so the petition must be filed by July 16, 1924.

File Bone Bill With Washington Secretary of State

The long looked for and widely heralded Bone power bill was filed as an initiative measure with the secretary of state of Washington on April 8. The bill is to be known as initiative measure No. 52 and petitions will be circulated within a short time, following completion of the necessary formalities. It will be necessary to secure approximately 40,000 signatures of qualified voters to place the bill before the voters at the next general election in November. The petitions will have to be filed with the secretary of state by July 3.

Briefly the bill authorizes cities and towns to use, purchase and dispose of electric current inside or outside of their corporate limits, to construct and maintain or purchase inter-tie and transmission lines and distribution systems and to exercise the right of eminent domain in the establishment of municipal power systems. The purchase and sale of such electric current is to be free of tax.

Section 3 of the proposed measure would empower any city or town to acquire by condemnation the right to use the line of any railroad not a common carrier for the transportation of materials for the construction of a municipal power plant if a mutual agreement as to the use of the line could not be reached.

This feature is said to be designed especially for the relief of the city of Aberdeen, where a logging road has refused transportation of materials to the site of the proposed municipal plant, making it necessary under existing laws for the city to construct its own transportation line at an almost prohibitive cost. The condemnation right would also extend to log booming and other facilities of the carrier, needed in the construction of the plant.

Oliver T. Erickson, author of the Erickson Bill, which is a more comprehensive public ownership document, is reported to have abandoned efforts to obtain signatures for his measure. It is understood that Mr. Erickson will devote his efforts to securing the passage of the Bone bill which he has characterized as "a step in the right direction."

Bids to Be Called For on Alouette-Stave Tunnel.—The British Columbia Electric Railway Company of Vancouver, B. C., will call for bids in the very near future for the construction of the Alouette-Stave tunnel, which is to form a part of the company's Alouette power development project. The work will include 3,400 ft. of main tunnel 14 ft. in diameter; 1,000 cu.yd. concrete; 4,500 cu.yd. rock excavation in shafts and intake; 120 ft. of adit 10 ft. in diameter; and 120,000 lb. of reinforcing steel.

Court Directs Return of Power Funds Used for Propaganda

Members of the Board of Public Service Commissioners of Los Angeles, Calif., have been ordered, by a recent court decision, to return to the city treasury the sum of \$12,415.15 which was spent in campaigning for the Bureau of Power and Light's \$35,000,000 bond issue last spring. The decision calling for the return of the money was handed down by Judge Edward I. Butler, of the Superior Court of Los Angeles County. Legal action was brought by W. W. Mines, a taxpayer, against the commissioners to secure the return of the money that he claimed was spent in securing brass bands, literature and other forms of propaganda. It is inferred that the commissioners will have to make up the sum from their own pockets.

The commissioners admitted spending the money for the purposes enumerated by Mr. Mines, but contended that they were justifiable. The court swept aside these contentions and declared in effect that the commission is bound under the charter to expend power revenues only for the administration and expansion of the property itself and not for political purposes.

Judge Butler, in the opinion handed down, cites the fact that the city charter of Los Angeles governs the actions of the Board of Public Service Commissioners and states that definite restrictions are placed upon the expenditures of revenues of the city's power system. He also cites the provisions of the Municipal Bonding Act which empowers the city to call a bond election. Under this act provisions are made for notifying the public of the coming election and one section requires the publication of bonding ordinances in a local newspaper, following a definite schedule. If there is no newspaper in the municipality, the act provides that the ordinance be posted in three public places for two succeeding weeks. The act also states that, "No other notice of such election need be given."

In summing up the case the opinion reads as follows:

"When the resolution of public necessity has been passed and the ordinance ordering the submission to voters of the question of voting bonds has been adopted and published as provided in the act, it then becomes a matter for the voters to decide whether or not it is best to incur a bonded debt. This is a question concerning which there can be an honest difference of opinion. The wisdom of the policy of incurring the debt is for the qualified electors of the city to decide. The law leaves it to them.

"The provision in the Bonding Act that no other notice of such election need be given necessarily implies that no other notice of such election can be given at the expense of the city's funds, no matter from what source derived. Manifestly the Board of Public Service Commissioners, as such, has nothing to do with it. It is within the power of the said board to expend the proceeds of the bonds (if they should be authorized) in the extension, repair, betterment, etc., of the light and power system, and the law gives them a wide discretion in such matters. But expending public funds in making a campaign in favor of the bonds cannot be justified

any more than could its expenditure in making a campaign against them. Should the people of Los Angeles deem it desirable that the Board of Public Service Commissioners or the City Council should have such power, they can easily confer it by a charter amendment.

"In Dillon on Municipal Corporations, Vol. I, section 237 (fifth edition) we read: 'It is a general and undisputed proposition of law that a municipal corporation possesses and can exercise the following powers and no others: First, those granted in express words; second, those necessarily or fairly implied in or incident to the powers expressly granted; third, those essential to the accomplishment of the declared objects and purposes of the corporation, not simply convenient, but indispensable. Any fair, reasonable, substantial doubt concerning the existence of power is resolved by the courts against the corporation, and the power is denied. Of every municipal corporation the charter or statute by which it is created is its organic act. Neither the corporation nor its officers can do any act, or make any contract, or incur any liability not authorized thereby, or by some legislative act applicable thereto. All acts beyond the scope of the powers granted are void. Much less can any power be exercised or any act done which is forbidden by charter or statute. These principles are of transcendent importance and lie at the foundation of the law of municipal corporations.'

"Viewing the acts done by the defendants in the light of the charter provisions and State law on the subject of bond elections, I fail to see where there was any authority to make the expenditures for the purpose alleged in the answer. Being without authority they are void, and judgment must be for the plaintiff. It is so ordered."

Literature now being sent out by the Bureau of Power and Light in support of the \$21,000,000 bond issue to be voted on May 6 involves an expenditure of the same kind, declared illegal in the decision of Judge Butler. It is reported that the case will be appealed to the Supreme Court and if the decision is sustained other threatened taxpayers' suits will seriously hamper the Bureau of Power and Light. The threatened suits hang around claims that large sums of money have been spent on political lobbying trips to Washington and in supporting the Swing-Johnson Boulder Dam project.

Seattle to Have Third Electric Home.

—By unanimous vote, members of the Electric Club of Seattle, Wash., have voted to hold an electric home demonstration, and an electrical campaign during the summer. Both show and campaign will be patterned after those successfully held in Seattle during the past two years.

Increased Electrical Business in Oakland, Calif., Foretold.—Speaking recently at a meeting of the Electric Club of Oakland, Calif., T. E. Bibbins, president of the Pacific States Electric Company of San Francisco, commented on the rapid growth of Oakland and prophesied increased business for central stations, supply houses and electrical appliance dealers.

Let Contract for Construction of Cushman Storage Dam

Contract for construction of the storage dam, the first unit of the proposed Lake Cushman power project, under development by the city of Tacoma, Wash., has been awarded to A. Guthrie & Company of Portland, Ore., on their bid of \$881,193.75. This figure is \$279,306.25 under the estimate of J. L. Stannard, chief engineer of Tacoma, who placed the cost at about \$1,160,500. There was a great range in the eight bids submitted, with a figure of nearly \$500,000 separating the highest and lowest.

The dam will be built in the throat of the rock canyon of the North Fork of the Skokomish River. It will rise 235 ft. above the bed of the canyon, exclusive of the foundations below stream level. It will impound back of it 450,000 acre-feet of water when the reservoir is full, creating a lake 10 miles long with an average width of one mile.

The first power unit will be installed a short distance below the dam, in the canyon bottom, and will develop about 37,500 kw. Later, a second use of the water will be made at sea level, to produce an ultimate 67,500 hp.

The first work of the contractor will be the driving of a tunnel about 1,000 ft. long, which will serve during construction to divert the water of the river, while the dam is being built, and after completion of the plant to carry water from the reservoir to the turbine.

Abolition of Oregon Commission Initiative Bill Aim

Voters of Oregon will be given an opportunity, at the November elections, to vote on an initiative bill designed to abolish the Public Service Commission and to restore all franchises, ordinances, contracts, etc., between public service corporations and municipalities, according to reports from that state. The act would set aside all "rules, orders, regulations, demands, decisions, powers, privileges and acts" of the Public Service Commission and its predecessor, the Railroad Commission of Oregon, and restore to those officials, municipalities and bodies whose powers were abridged or transferred to the commission all authority, power and privilege as it existed prior to 1907, when the Railroad Commission was created.

Initiative petitions to place the measure on the November ballot have not as yet been circulated. This is not the first time that the abolishment of the commission has been talked of, but it is the first instance where an initiative bill has been actually prepared for circulation. It is understood that another bill, that would abolish the present commission and substitute one appointed by the governor, is being drawn up at the present time.

Seattle Business Building to Be Electrically Heated.—The new two-story Kermot Building to be erected in Seattle, Wash., by Dr. L. H. Kermot, Minot, N. D., from plans drawn by John Graham, will feature electrical heating throughout. This will be the first business block in Seattle entirely heated by electricity. The structure will cost \$125,000.

Success of Boulder Canyon Legislation Doubtful

Federal Power Commission Members in Letter and Testimony Give Little Support to Swing-Johnson Bill Advocates

Recent developments brought forward at the hearing before the House of Representatives' committee on irrigation of arid lands appear to have undermined the Boulder Canyon proposal to such an extent that the entire collapse of the project is predicted. The advocates of the Swing-Johnson bill gained little ground as the result of the testimony of the Secretaries of War, Interior and Agriculture, who comprise the Federal Power Commission. These Cabinet members were summoned to appear before the committee following their letter sent to the committee the latter part of March.

In this letter, which caused considerable furor among the supporters of the Swing-Johnson bill, the Secretaries called attention to the danger of the government entering the power business stating that, "The present investment in the United States in central electric stations—that is in those plants engaged in developing electric power for general distribution and sale—is approximately \$4,500,000,000. That investment will require to be more than doubled in the next ten years if the demands of the industry are to be met. A policy of federal power development would therefore require continuous expenditures of not less than half a billion dollars per annum, for it could not be expected, in the face of such a policy supported by government funds and with tax-exempt properties, that private industry could afford to put in any additional investment into the central station business. Under such circumstances we must assume that any such policy or program of federal activities is impracticable and undesirable."

The Secretaries' letter also advised against making the Boulder Dam project any exception from government practice and stated that private capital was ready and had been ready to develop the Colorado River and to provide for flood control and irrigation as well as the generation of electricity. In regard to the success which the Federal Power Commission has had in the three years it has existed the letter stated:

"Congress also, in the Federal Water Power Act, created a single executive agency for the administration of all water powers under federal ownership or control. The plan thus adopted is proving eminently satisfactory. We believe any change in such method of administration is undesirable, and therefore, whether the Boulder Canyon Dam or some other be built and whether at public or private expense, we believe the disposition of any power developed should be handled by the Federal Power Commission under the general terms of the Federal Water Power Act, and not as proposed in the bill. All interests of the Department of the Interior will be adequately met through the membership of the Secretary of the Interior on the Commission."

The letter also brought forward the fact that the international problem should be considered in connection with the project and recommended that it is "highly desirable to reach a general agreement with Mexico on the problems of the lower river before extensive

storage is provided in the United States."

At the hearing held before the irrigation committee the Secretaries made it clear that the attitude of the Federal Power Commission is to urge an adjustment of existing differences in order to allow the development of the Colorado River to begin. Advocates of the Swing-Johnson bill endeavored to get the members of the Federal Power Commission to assert that no rights would be issued on the Colorado River as long as Congress is considering a possible exception to the water-power act. No such commitment could be secured and it was evident from the testimony that rights would be granted immediately upon ratification of the Colorado River compact.

The importance of negotiating a treaty with Mexico has been called to the attention of the State Department, and it is assumed that action will be taken at an early date. The lands tributary to the Colorado on the Mexican side of the border are in great demand. The minute the low-water flow of the river is increased the water will be appropriated. More than a million acres of particularly desirable land in Mexico awaits this development, and the time to negotiate the treaty, it is pointed out, is before appropriation and use become the controlling factor.

Col. William Kelly, the chief engineer of the Federal Power Commission, brought out with particular clearness, in the course of his testimony before the committee, that the Boulder Dam recommended by the Bureau of Reclamation is not the best way to utilize the maximum resources of the Colorado. To build the dam as suggested by the Reclamation Bureau, he pointed out, will mean the ultimate loss of 300,000 hp., while the huge reservoir it will create will result in excess evaporation sufficient to irrigate more than 40,000 acres of land.

Northwest Association to Hold Convention June 25-27.—The 1924 annual convention of the Northwest Electric Light and Power Association will be held at the Gearhart Hotel, Gearhart, Ore. Dates for the convention have been set as June 25-27, inclusive. The time of the convention is so arranged that members attending the annual convention of the Pacific Coast Electrical Association at Coronado, Calif., June 16-20, will have an opportunity to reach Gearhart for the Northwest association meeting.

Date of Power Conservation Committee Meeting Changed to May 2.—Fear of a power shortage in California has been decreased due to recent general rains throughout the valleys of California. Some snow has also fallen in the mountains. Optimistic reports have been received from power company officials and as a result the California State Railroad Commission has announced that the meeting of a special committee appointed to devise measures for conserving power, originally set for April 1, will be held in San Francisco on May 2.

Management Fee Reduced in New Electric Rate Schedule

A new schedule of rates for electric service, furnished by the Western States Gas & Electric Company, of Stockton, Calif., has recently been ordered by the California State Railroad Commission. The new rates are practically on a par with those in adjoining towns. The engineering staff of the commission set the value of the company's holdings at \$1,500,000 under the company's valuation.

A ruling that the Western States Gas & Electric Company should not be allowed to pay the Byllesby Engineering & Management Corporation a management fee of 2½ per cent of gross revenue was also included in the order. The ruling stated that a well paid manager was employed by the California utility and that his salary should be deducted from the 2½ per cent operating charge. The amount that will be paid the holding company will thus be reduced to about 1½ per cent of the gross revenue. The commission holds that the managing company renders valuable assistance to the local company in the way of helping to finance the property and in purchasing material and supplies at an advantageous price. It is acknowledged that the central engineering and accounting department renders a useful and supervisory service.

Gorge Creek Tunnel Will Not Be Completed by May 1

The Gorge Creek tunnel in the Skagit hydroelectric project under development by Seattle, Wash., will not be completed May 1, a date for completion previously given by R. C. Storrie & Co., contractors. The company's representatives have announced that another extension of time will be necessary, occasioned by recent high waters in the Skagit River. During this period work necessarily was discontinued.

The city council has been unable to arrive at a decision as to whether the contractors shall be penalized for failure to complete the dam in the stipulated time. The company's contract provides for a penalty of \$500 a day for each day after Sept. 1, 1923, that the tunnel remains uncompleted. The company has been granted repeated extensions of time, upon recommendations of city officials, who claim that the delays have been largely inevitable, and occasioned in part by failure of the city to perform its work.

Proposed Rates for Hetch Hetchy Water and Power Service to Modesto Irrigation District.—As a provision against possible shortage, the Modesto (Calif.) Irrigation District recently requested prices and terms from the city of San Francisco on the delivery of power of from 1,000 to 8,000 kw. and of 1,000 to 50,000 acre-ft. of water from the Hetch Hetchy project. City Engineer O'Shaughnessy has recommended to the Board of Supervisors that standby power service be furnished to the district at \$10 per kw. per year for installed capacity and that eight-tenths of a cent per kw-hr. be charged for power actually used, and that water be released at \$1.50 per acre-ft. The irrigation district would be required to furnish its own substation for distribution.



Caribou Power House of the Great Western Power Company in which a third 32,000-hp. unit has recently been installed.

Third Caribou Unit Is Placed in Service April 10

The third unit of the Caribou plant of the Great Western Power Company on the North Fork of the Feather River in Plumas County, Calif., was put in service April 10. The new unit has a capacity of 32,000 hp. and is operating under an effective head of 1,074 ft. The installation was completed at a cost of \$1,000,000, and is the first of the company's projected developments to be completed during 1924.

Hydraulic equipment for the new unit was supplied by the Allis-Chalmers Manufacturing Company; generator, transformers and switchboard equipment by the General Electric Company and the penstock by The M. W. Kellogg Company. The installation was made under the direction of the engineering department of the Great Western Power Company.

Additions to the power house were unnecessary, provisions for the third unit having been made at the time the plant was built. Water for operating the Caribou plant is secured from the Butt Valley watershed and from Lake Almanor.

Code Committee Appointed by Contractors' Association

In accordance with the resolution of the California State Association of Electrical Contractors and Dealers passed at the quarterly meeting held at Stockton, Calif., March 15, Victor Lemoge, president of the association, has appointed a committee to consider matters pertaining to the National Electrical Code and to other wiring regulations. This committee will give heed to improved wiring methods, higher standards of installation, and to all general matters in connection with better wiring.

The personnel of the committee is as follows:

E. E. Browne, chairman, Browne-Langlais Electrical Construction Company, San Francisco
Walter Spencer, Spencer Electric Company, Oakland
H. W. Jacobs, Jacobs Electric Company, Santa Rosa
Fred Doerr, Garden City Electric Company, San Jose
M. P. Cannon, Latourrette-Fical Company, Sacramento
J. A. Schanbacher, Schanbacher Electric Shop, Watsonville
R. C. Mixer, Mixer Electric Company, Lodi
F. C. Sherman, Sherman Electric Company, Corning
Frank Thomas, Valley Electrical Supply Company, Fresno.

Small Hydroelectric Plant Projected.

The North Pacific Service Corporation of Port Angeles, Wash., has filed application with Marvin Chase, Washington hydraulic engineer at Olympia, for a water right on Morse Creek. A 4½-mile pipe line is to be constructed to turn the flow of the river into Emmis Creek for power development. It is reported that work will start within 90 days and the cost is to be approximately \$125,000.

Licenses and Permits Are Issued by Federal Commission

Four licenses covering power projects in the West have recently been issued by the Federal Power Commission. The licenses cover the following projects: Escondido (Calif.) Mutual Water Company, for the enlargement of an existing development; the Sitka (Alaska) Wharf & Power Company, for a constructed project; the Excelsior Water & Power Company, Smartville, Calif., for a project on the South Fork of the Yuba River in Nevada County, and is for a period of ten years only and during that time the power will be sold to the Pacific Gas and Electric Company; and a small project of A. E. Humphreys of Denver, Colo., on Goose Creek in Mineral County.

Four preliminary permits for Western hydroelectric developments have also been issued by the commission. These permits cover the following: Idaho Power Company, Boise, Idaho, for a power project on the Snake River near Twin Falls which is to have a proposed ultimate development of 10,000 hp.; Mrs. Alice B. Jones, Pueblo, Colo., for three developments on the North, Middle and South Forks of St. Vrain Creek in Boulder County, which will have a proposed ultimate capacity of 17,000 hp.; Charles W. Thuringer, Denver, Colo., project on South St. Vrain and Lefthand Creeks in Boulder County, which will have an ultimate installed capacity of 3,000 hp.; and Messrs. Gay, Otto and Diefendorf, Pueblo, Colo., for a project on North St. Vrain Creek which is to have an installed capacity of 5,300 hp.

The commission has also announced that it has received three applications for licenses for small projects in the West and for one preliminary permit in the same territory.

Large Impulse Unit Ordered for Big Creek No. 1 Plant

What is believed to be the world's largest hydraulic prime-mover of the impulse type will be installed by the Southern California Edison Company in its Big Creek No. 1 plant during the latter part of 1924. Orders have been placed with the Pelton Water Wheel Company of San Francisco for the design and construction of a double overhung horizontal impulse water wheel capable of developing 35,000 hp. under a head of 1,900 ft. This installation is in addition to three previous units of 22,000 hp. each in the Big Creek No. 1 station, bringing the total capacity of this plant up to 99,300 hp.

The capacity of Big Creek No. 2 will also be increased by 22,500 hp. through the installation of another Pelton impulse water wheel. The unit, which is to be placed in service during this year, is to operate under an effective head of 1,780 ft. Big Creek No. 2 will then develop a total of 86,800 hp.

One feature of particular interest in the 35,000-hp. unit is the special design of the lower housings, disk rings and hubs, which will permit of the changing of all or parts of the water wheels with a minimum loss of production time. Replacement of parts can be quickly accomplished or the prime-mover may be changed over from 50-cycle to 60-cycle operation through the use of interchangeable parts.

Book on Standardization Published.—

The American Engineering Standards Committee has just issued a book entitled "Standardization—What It Is Doing for Industry." This describes how standardization is being carried on, first in the individual plant, second in industry as a whole, third nationally on an inter-industrial basis, fourth and last, internationally. This book can be had by writing to the office of the American Engineering Standards Committee, 29 West 39th Street, New York City.

Water Rights Granted to Utility by State Power Board

Two permits covering power sites in Nevada and Placer Counties of California have been issued to the Pacific Gas and Electric Company by the Division of Water Rights of the California Department of Public Works. One permit allows the appropriation of 26,670 acre-feet per year from Fordyce Creek in Nevada County for the purpose of developing 17,170 hp. After the water is passed through the company's power house it will be used for irrigating purposes. The estimated cost is \$745,500. A second permit is for a project that is to develop 8,693 hp. by utilizing 100 sec.-ft. of water from the Bear River.

The Division of Water Rights has announced that during March it received seven applications covering large hydroelectric power projects. E. B. Perrin, Los Angeles, filed two applications covering projects in Tehama County. One of these is for 50 sec.-ft. and 12,000 acre-feet of water from Thoms Creek and the other is for 150 sec.-ft. and 20,000 acre-feet from the same source. The first project contemplates the generation of 5,823 hp. and the second a development of 27,272 hp.

The Bear River Water & Power Company, Auburn, contemplates the development of 42,994 hp., by diverting 250 sec.-ft. and 100,000 acre-feet per year from the Bear River in Placer and Nevada Counties. The Feather River Power Company, San Francisco, has filed three applications for water from Gold Lake in Sierra and Placer Counties, from Bucks Creek in Plumas County and from Grizzly Creek in Plumas County. All three applications are supplementary to an original application of the company.

The development of 24,148 hp. is contemplated by G. de Bretteville, San Francisco. It is the applicant's intention to divert 250 sec.-ft. and 30,000 acre-feet of water per year from the Middle Fork of the Yuba River in Yuba and Nevada Counties. The estimated cost of the project is \$3,500,000.

British Columbia Company Is to Reduce Lighting Rates

Domestic lighting rates in Vancouver, B. C., will on or about May 1 be voluntarily reduced by the British Columbia Electric Railway Company. The new rates will be of the two step type, five cents per kilowatt-hour being charged for the first three kilowatt-hours per 100 sq. ft. and two cents per kilowatt-hour for all current in excess.

This rate will be put in effect in Vancouver City for two-thirds of the population of the greater city, whereas the surrounding municipalities of Point Grey, South Vancouver, Burnaby and North Vancouver with a population of 65,000 will be charged six cents for the first step and three cents for the second.

A minimum of 1,000 sq. ft. will be allowed or 30 kw.-hr. in order to take advantage of the low second step rate. The minimum charge of 50 cents a month will continue as in the past.

The present rate in Vancouver City is 5 cents a kilowatt-hour straight; in the municipalities affected the rate varies from 6 cents to 8.8 cents.

In order to ascertain the floor areas of the houses, the company proposed to accept customers' estimates until they

could be checked but on looking into the experience of other cities, decided to make its own estimates, using insurance maps for the purpose. A corps of men will be employed to do this work.

The new rates will be a reduction of 12½ per cent on the average and will cause a decrease in the company's revenue of \$100,000, taking into account an increase in consumption of current.

This is the fourth reduction in rates which the company has made since 1917. In that year the rate was 11 cents gross or 8.8 cents net with a meter charge of 15 cents. The rate was reduced on Jan. 1, 1918 to 8 cents net with no meter charge; on Jan. 1, 1919 to 6 cents net and on Jan. 1, 1923 to 5 cents net. Opportunity was taken at the time of these reductions to differentiate between the city proper and the surrounding municipalities which have been paying an additional one cent a kilowatt-hour.

To acquaint its consumers with the way in which the new rate will operate the company has prepared a booklet entitled "More Light for Less." In this booklet the copy describes the application of the rate and shows how the customer is benefited. The reasons for adopting the new schedule are also explained.

North Platte River Commission Organized at Washington

The North Platte River Commission, recently appointed for the purpose of formulating a compact between the states of Colorado, Nebraska, and Wyoming and the United States, respecting the use and disposition of the waters of the North Platte River, was organized at Washington, D. C.

State representatives on the commission, all of whom were present, are: Delph E. Carpenter, Colorado; Robert H. Willis, Nebraska; S. G. Hopkins, Wyoming. Judge Stephen B. Davis, solicitor for the Department of Commerce and federal representative on the commission, was elected chairman. The meetings were held at the Department of Commerce on March 20 and 21, and were attended by Ottomar Hamele, chief counsel of the Bureau of Reclamation.

Following a general discussion of the problems to be dealt with, the commission adjourned with the understanding that later meetings would be held in the West, at which time there would be public hearings at points in the three states concerned. It is the hope of the commission that the various controversies and difficulties on this river as between the states themselves and with the United States, may be settled through an agreement of all parties. No compact can become effective, however, until ratified by the Congress of the United States and the legislature of each of the states.

Power Company Places Large Insulator Order.—The Washington Water Power Company, Spokane, Wash., has awarded contracts for twelve carloads of porcelain insulators for high tension lines. The Pacific States Electric Company and the Western Electric Company of Spokane and the Ohio Brass Company of Mansfield, Ohio, will each supply four carloads.

Seattle Electric Club Prepares Telephone "Smile" Plaque

To promote courteous service both within the industry and in telephonic communications that members of the industry may have with other persons, the Electric Club of Seattle, Wash., has recently distributed small circular cards that are designed to be attached to the mouthpiece of any telephone. The cards



Telephone transmitter plaque recently distributed by the Electric Club of Seattle. The dotted line in the center of the emblem shows the portion of the card that is cut away so that the card may be attached to the telephone.

have been placed in the hands of every electrical man in Seattle and the aim is to have one of them put on the mouthpiece of every telephone that is used by members of the industry in that city.

The slogan appearing on the emblem—"Say It With a Smile, The Other Party Can Only See Your Voice"—is the same one that was first used by The California Oregon Power Company on a similar telephone plaque. The emblem prepared by the Electric Club of Seattle is printed in black ink on a thin piece of buff-colored bristol board and is about 3¼-in. in diameter.

Wyoming Utilities Association Convention Dates Changed to Follow Atlantic City Meeting.—The annual convention of the Wyoming Utilities Association will not be held until after the National Electric Light Association annual convention, according to a recent announcement of H. C. Chappell, secretary of the association and one of the executives of the Natrona Power Company. It is understood that if present plans materialize, the convention, which will also include a quarterly meeting of the Rocky Mountain division of the National Electric Light Association, will be held in the new office building of the Natrona Power Company at Casper, Wyo. Construction of this building is well under way and one of its features will be a commodious assembly hall and demonstration room. The dates and location originally announced for the convention, May 5-7, at Cheyenne, are in error.

Portland Labor to Investigate Municipal Power Plant Possibilities.—At a recent meeting of the central labor council of Portland, Ore., a committee was appointed to investigate the possibilities of a publicly owned hydroelectric project for that city.

Pacific Coast Association Adds Members to Committees

The Pacific Coast Electrical Association has announced several additions to the personnel of various committees. All of these committees have reports for the annual convention at Coronado, Calif., June 16-20. The following are changes in or additions to committee personnel.

Publicity—Paul R. Miller, district advertising manager, Westinghouse Electric & Manufacturing Company, Seattle, Wash.

Insurance—R. J. Gantrell, Pacific Gas and Electric Company, chairman; A. G. Johnson, manager and auditor, Arizona Power Company, Prescott, Ariz.; Henry E. Luce, engineer, Truckee River Power Company, Reno, Nev.; W. E. Duffrey, San Joaquin Light & Power Corporation, Fresno, Calif.; G. S. Vance, second vice-president, Los Angeles Gas & Electric Corporation, Los Angeles; Herbert Dewes, assistant to president and general manager, Southern Sierras Power Company, Riverside; Glifton Peters, secretary, Southern California Edison Company, Los Angeles; H. R. Peckham, assistant general superintendent, San Diego Consolidated Gas & Electric Company, San Diego.

Overhead Systems—The following have been added: E. R. Banks, D. D. Smalley, George M. Bowman and E. A. Quinn, all of the San Joaquin Light & Power Corporation, Fresno; E. G. Taylor and G. B. Judson, of the Los Angeles Gas & Electric Corporation, Los Angeles; H. G. Sharp, Pacific Coast Steel Company, San Francisco; A. G. Putnam and P. W. Greenleaf, of the Southern Sierras Power Company, Riverside.

Personnel—S. G. Haver, Jr., succeeds R. J. Baker as chairman (Southern California Edison Company, Los Angeles); Wm. H. Ellison, San Diego Consolidated Gas & Electric Company, San Diego; E. G. McGann, Pacific Gas and Electric Company, San Francisco.

Purchasing and Stores—John H. Hunt, purchasing agent, Pacific Gas and Electric Company, San Francisco, has been added to this committee.

Public Relations—E. J. Beckett, assistant treasurer, Pacific Gas and Electric Company, San Francisco, has been made chairman of Relations with Financial Institutions Committee.

Commercial Section—The following have been added:

Commercial Heating—O. B. Doerr, Great Western Power Company, Oakland; W. G. Tanner, Southern California Edison Company, Los Angeles; G. B. Merrick, San Joaquin Light & Power Corporation, Fresno.

Signs—C. O. Martin, Benjamin Electric Manufacturing Company, San Francisco (succeeds as chairman) H. L. Johnson, Southern California Edison Company, Los Angeles; C. B. Merrick, San Joaquin Light & Power Corporation, Fresno; A. E. Sargison, Edison Lamp Works, San Francisco; Glark Baker, National Lamp Division of General Electric Company, Oakland.

Commercial Lighting—Victor W. Hartley, San Francisco, succeeds H. H. Courtright of Fresno as chairman; Glark Baker, National Lamp Division of General Electric Company, Oakland; Frank van Gillowe, Western Electric Company, Los Angeles; Walter A. Alden, Westinghouse Electric & Manufacturing Company, Los Angeles.

Industrial Heating—J. G. Kyle, Southern California Edison Company, Long Beach; E. V. Kane, 207 South Broadway, Los Angeles; H. A. Mulvany, Electric Sales Service Company, Berkeley; Jack Wells, Los Angeles Gas & Electric Corporation, Los Angeles; G. P. Hering, Great Western Power Company, San Francisco; H. G. Smith, Southern California Edison Company, Santa Barbara; M. F. Rhodes, Southern California Edison Company, Alhambra.

Tacoma Men Prepare to Display Electric Home in May

Plans for the proposed electric home to be constructed and equipped by the Electric Club of Tacoma, Wash., have been completed, and construction work is well under way on the seven-room Dutch Colonial residence, at 716 North C Street. The structure is located in Tacoma's most exclusive residence district, with a fine water and mountain view. If present plans materialize, the home will be ready for exhibit about May 10. B. R. Nichols, of the city light department, is chairman of the general committee in charge of the exhibition.

The home will be heated by a 20-kw. hot air furnace, with remote control switches in the hallway. The Sarco system of circulation will be used in connection with the heating system.

Each room is provided with four or more convenience outlets, these being located about knee-high from the floor instead of in the baseboard. Each room is also provided with the latest type of soft indirect lighting. The breakfast nook is completely equipped with outlets for small appliances and the dining table will be wired through a floor outlet. A dishwasher will be an integral part of the kitchen sink and the kitchen will have an electric range, an ice machine and many of the smaller appliances. The basement will be equipped with an electric washing machine, ironer, clothes dryer and water heater. All of the modern smaller appliances will also be found in the house.

Municipal Telephone Regulation Favored by Seattle Council

The city council of Seattle, Wash., has approved legislation that would give the city broad power in telephone rate-making and service. By unanimous vote, the council adopted a resolution favoring enactment of an initiative law by voters of the state, "authorizing municipalities to regulate the rates and service of privately-owned telephone companies and granting the municipalities the right to construct, purchase, operate, lease or condemn telephone lines, plants and systems."

The proposed initiative act has been endorsed by the city commissioners of Spokane, and Tacoma commissioners are expected to take similar action.

The act was drawn following the attempt of the Pacific Telephone & Telegraph Company to raise telephone rates in Seattle, Spokane and Tacoma. An appeal by the telephone company from the ruling of Federal Judge E. E. Cushman of Tacoma, denying the increase, is before the U. S. Supreme Court. It is expected that efforts will be made to prepare the measure to place it on the November election ballot.

Constitutionality of State Tax on Electric Trucks Upheld.—In a decision rendered recently in the suit of the Old Homestead Bakery, Inc., San Francisco, Calif., against Will H. Marsh, chief of the state motor vehicle department, Judge Peter J. Shields upheld the constitutionality of the statute providing for a \$50 registration fee for each electric truck. The bakery company had tendered payment of the fee based on \$3 for registration and the balance according to weight, and upon its being refused sued on the ground that the \$50 tax was unconstitutional, illegal, disproportionate and arbitrary.

Bankers Negotiating for Colorado Power Company Stock.—Reports from New York City state that A. B. Leach Company, a New York banking firm, is negotiating for 35 per cent of the common stock of the Colorado Power Company. The bankers will not take less than 35 per cent of the stock. The directors of the Colorado Power Company recommend selling and have already deposited their holdings for such sale. It is understood that the negotiations are being made at the instance of the Cities Service Company.

Books and Bulletins

CAR LIGHTING BY ELECTRICITY

By CHARLES W. STUART. 356 pages, 256 figures. Published by Simmons-Boardman Publishing Company.

Few men in the electrical industry realize the strides that have been made in the lighting of passenger cars on steam railroads during the past twenty years. From the earliest attempts, in the year 1881, when a storage battery was first used, down to the present day, the adoption of electricity for car lighting has kept pace with the other branches of the electrical industry.

According to the author, who is a foreman of car lighting and is located at the Pennsylvania Terminal of the Pennsylvania Railroad, it is intended to present in this book the various phases of car lighting so that the practical worker, the engineer, and the student will find sufficient information covering such phases of the subject as may have a direct interest for him.

The book starts with a short history of train lighting and then short chapters follow treating of the straight storage battery system, the head-end system whereby a generator located at the head end of the train furnishes power for lighting the whole train, and then the axle generator system which appears to be gradually supplanting other systems. Two chapters follow dealing with the regulating apparatus and the methods of transmission for the axle generator.

Train lighting storage batteries and the ampere-hour meter are then treated, followed by chapters on lighting circuits and fixtures, with detailed instructions in testing, adjusting, inspecting and handling car lighting equipment. Four chapters are then devoted to the various systems of axle lighting as commonly used on American railroads and the final chapter deals with direct-drive as distinguished from belt-driven axle generating equipment.

An appendix of thirty-one pages gives the standards and recommended practice of the American Railway Association.

Throughout the book the text is clear and the photographs and drawings are good. The author has performed a good work in assembling information on this somewhat specialized subject in one volume. The only suggestion which the reviewer has to offer is that, in some future edition, the subject be treated in greater detail in some sections of the book.

E. R. S.

INFORMATION FOR INVENTORS

By GARLOS P. GRIFFIN, 711 Pacific Building, San Francisco. 48 pages. Fourth Edition.

A brief discourse on some of the fundamentals in connection with the necessity for and solicitation of patents. The author has been a patent attorney for many years and writes from experience. The book is not intended as a treatise on patent procedure but is merely to give in concrete form the elementary information that is generally sought by inventors.

Meetings

Intermountain Electrical Men Hold Annual Convention

The third annual convention of representatives of the various branches of the electrical industry in the Intermountain section was held at the Hotel Utah, Salt Lake City, Utah, April 4. The conference was held under the auspices of the Rocky Mountain Electrical Co-operative League. Approximately 150 electrical men from Salt Lake City and from various other sections of the Intermountain territory were in attendance.

The first meeting was called to order by H. M. Ferguson, manager of the Salt Lake division of the Utah Power & Light Company, and chairman of the advisory committee of the league. Mr. Ferguson presented a review of the activities of the league during its existence, and particularly during the past year. The Lighting Service Bureau, he said, which is now functioning as a definite part of the league, has been of immense value in educating the merchants to the need of more and better lighting, with many important installations as a result. He stated that this bureau is bringing about a co-ordination of the salesmen's activities, and that the customer's problems are analyzed from a broader point of view rather than from that of the contractor-dealer endeavoring to sell him fixtures or of the power company man trying to sell him kilowatt-hours. The real needs of the merchant himself are being analyzed, he said.

L. B. Johnson, of the Salt Lake City office of the General Electric Company, spoke on the subject of "Merchandising House Wiring." "The electrical contractor," Mr. Johnson said, "has grown up from a house wireman. He is a specialist. His specialty is house wiring. But as a business man he is not so far advanced as merchants in other lines. He must realize that if volume of business is desired he must do creative educational work so that there will be a demand for new wiring in old as well as new houses."

The speaker recommended newspaper advertising as the first means to consider in promoting the sale of house wiring; then window and cooperative demonstration, with a sales force trained to tie in with such a program. Direct-by-mail campaigns were also suggested. Other suggestions made by the speaker were: the placing of signs on jobs; inside store displays of wiring devices mounted on boards or panels, illustrating new methods and new devices, either for old or new homes; tying in with electric home demonstrations; training salesmen to talk intelligently regarding installations; and constantly selling the idea of more convenience outlets.

A talk on "Psychology of Demand" was given by Prof. George S. Snoddy, professor of psychology of the University of Utah. Dr. Snoddy analyzed the work of the advertisement and stated that the biggest problem was that of finding the needs of the prospects and



Group of electrical men that attended the third annual convention of the electrical industry in the Intermountain region.

then attaching the merchandise to those particular needs. He touched the subject from many points and told of the proper way for a salesman to approach and analyze the wants of a customer.

"Merchandising Heating Appliances" was the subject discussed by C. W. Willard, of the Salt Lake City office of the Westinghouse Electric & Manufacturing Company. Mr. Willard stated that the dealer must first be sold on what the heating appliances will do for the purchaser before he can intelligently sell them.

He pointed out that advertising, whether on a large or small scale, is absolutely necessary, and that it should be concentrated on one certain definite article at a time. The window trim, he

A. J. Calloway, manager of the Salt Lake City office of the Western Electric Company, was the toastmaster of the banquet held in the evening and Markham Cheever, general superintendent and chief engineer of the Utah Power & Light Company, was the first speaker. Mr. Cheever's subject was "Hydroelectric Power Development in the Intermountain Region." He gave a general talk concerning the generation of electricity and then by means of slides illustrated the system of the Utah Power & Light Company.

Ralf R. Woolley, engineer of the United States Geological Survey, followed with a talk, supplemented by a large number of illustrations, describing a trip down the Green River. This trip was made by Mr. Woolley and several others to locate possible power sites.

COMING EVENTS

- National Electric Light Association—
Annual Meeting—Atlantic City, N. J.
May 19-23, 1924
- The Electric Power Club—
Absecon, N. J.
May 26-29, 1924
- American Association of Engineers—
San Francisco, Calif.
June 11-13, 1924
- Pacific Coast Electrical Supply Jobbers' Association—
Quarterly Meeting—Coronado, Calif.
June 12-14, 1924
- Pacific Coast Electrical Association—
Annual Meeting—Coronado, Calif.
June 16-20, 1924
- Northwest Electric Light and Power Association
Annual Convention—Gearhart, Ore.
June 25-27, 1924

said, should be devoted to one article rather than several different kinds at one time.

The store arrangement is a very important consideration and should be carried out with the idea of producing a pleasing and quiet atmosphere, with appliances accessible. Booths showing possibly a living room, a dining room and a kitchen, each fully equipped, are very effective, the speaker said. Mr. Willard also advocated the demonstration of small heating appliances to a much greater extent than has been the practice, and compared this situation with that of the automobile, where practically all sales are made through demonstrations.

Discuss Electric Home and Farm at San Diego Meeting

The electric home and the electrified farm received attention at two consecutive meetings of the San Diego (Calif.) Electric Club, March 25 and April 1. Alex Schreiber, builder of San Diego's last electric home, and chairman of the electric home committee this year, was chairman of the day on March 25. At the request of G. H. P. Dellman, president of the club, he outlined some of the things learned through the experience with the previous electric home and gave suggestions for the conduct of a similar plan this year.

Among the statistics Mr. Schreiber gave, those concerning the tendency for more electrification of homes, based on his actual building experience, were the most impressive. In 1913, he said, he built his first home here, and put in it 13 outlets. The last one he built had 96 and the electric home had 113. The woman who bought the home, it was reported, had 19 more put in. The average home he builds today has over \$400 in electric equipment as against \$100 to \$200 before the electric home.

A. E. Holloway, of the San Diego Consolidated Gas & Electric Company, spoke of the Pasadena electric home and stated that general opinion was in favor of homes of moderate price.

The better and more electrical farm equipment meeting on April 1 was in charge of E. W. Weathers. The meeting was featured by a talk by J. G. France, county farm advisor for San Diego County.

Manufacturer, Dealer and Jobber Activities

Pittsburgh Reflector & Illuminating Company, Pittsburgh, Pa., has placed on the market the Pittsburgh No. 52 reflector for show window lighting. The reflector is designed for use with a 200-watt Mazda C lamp and can also be used with a 150-watt Mazda C lamp by substituting the proper holder adapter. The reflector is used in connection with an ordinary 2½-in. holder. It is designed for use on show windows where the distance from glass to background is half or less than half of the distance from the floor to points where the reflectors are mounted.

The **Western Electric Company**, New York City, has announced price reductions on its various models of electric washing machines varying from \$12.50 to \$25. These reductions, it is claimed, do not affect the dealers' profit percentages.

Ward Leonard Electric Company, Mount Vernon, N. Y., has issued Bulletins No. 57 (revised) and 58. The first of these contains descriptions of Vitrohm fractional horsepower armature speed controllers and the second is devoted to the company's fractional horsepower starter which is provided with low-voltage protection for d.c. motors.

Page & Hill Company, Minneapolis, Minn., has recently published a handbook entitled, "Practical Information About Cedar Poles and Butt-Treating." The handbook contains practical information on the storage of poles, painting of poles, the proper and improper methods of unloading cars, counting and tallying and other practical data for use of engineers, purchasing agents, yard superintendents, foremen and foremen of line crews.

The **Esterline-Angus Company**, Indianapolis, Ind., has issued Bulletin No. 324. The bulletin contains reports from users of the company's graphic instruments showing applications in four different cases.

The **Westinghouse Electric & Manufacturing Company** has recently developed a small light and power plant for use without a battery, where service can be turned directly into the line. The plant is particularly suited for direct service or for auxiliary or standby service in such places as oil and gas wells, mines and quarries, motion picture outfits and for isolated sign boards. The plant has a capacity of 1,500 watts at 110 volts and operates on kerosene or natural gas. The four-pole generator, which is bolted to the engine frame, is of the sleeve type on the engine shaft with no bearings.

The **General Electric Company** has recently issued three index booklets. Titles of the booklets are: "Index to Instruction Books and Cards," "Index to Supply Part Bulletins" and "Index to Descriptive Publications."

The **Okonite Company**, Passaic, N. J., has published a 36-page booklet containing illustrations of Okonite installations throughout the country. Central station and railroad usage are featured in the booklet.

The **Rome Wire Company**, Rome, N. Y., has announced that it will move the machinery of the Atlantic Insulated Wire & Cable Company from Stamford, Conn., to Rome, N. Y., during the coming summer. The Rome Wire Company purchased the capital stock of the Atlantic company in 1922 and since that time the purchased company has been manufacturing rubber covered wire and cable sold under the Atlantic trade name. The Rome company has announced that the Atlantic brands of wire—"Dolphin," "Triton" and "Neptune"—will be manufactured at Rome following the move.

The **Stebbins Manufacturing Company**, Denver, Colo., is manufacturing a new electrically heated, electrically driven, double water feed seam dampener for use in laundries. The machine, known as the Metcalf seam dampener, is used to dampen starched collars after they have been laundered and pressed out, so that they can be folded without breaking.



E. T. Cook, standing before the store of the Sterling Electrical Company, Sacramento, Calif., of which he has just been made manager. This business forms part of the estate of H. H. Weigt, for whom Mr. Cook was superintendent for several years before Mr. Weigt died.

The **Lionel Corporation**, New York, N. Y., manufacturer of toy trains, has recently put on the market a device known as the Lionel automatic train control, which is built in the form of a railway block signal and is designed to stop electric trains for a predetermined period and then to allow the train to pass through the "block."

The **Hisey-Wolf Machine Company**, Cincinnati, Ohio, has recently reduced prices on its line of Hisey electric tools. Reductions in prices of electric drills range from 12½ to 17 per cent and other reductions from 5 to 10 per cent have been announced. Price List No. 29 contains the new list of prices.

Mills Electric Company, Long Beach, Calif., has recently been appointed sales and service dealer for the Hurley Machine Company. The Long Beach dealer has entered upon an extensive advertising campaign.

The **Monitor Controller Company**, Baltimore, Md., has announced that it is now using its standard side-arm switch previously used. By locating the closing magnet between the line switch and the thermal element, the construction is greatly simplified and all the advantages of using a Monitor standard switch are realized. No change has been made in the thermal relay which is a distinctive feature of Monitor Thermaload starters. Thermaload starters are used for starting polyphase induction motors up to 3 hp. 110 volts, and 10 hp. 220, 440 and 550 volts, by connecting them across the line, giving full-voltage, full-current and full-torque start.

The **Apex Electrical Distributing Company**, Cleveland, Ohio, has recently brought out dealers' sales-help material described as "Kook-Rite Merchandising Plan." A description of the material is contained in an eight-page folder which contains examples of letters, folders, circular post cards and advertisements.

Jones-Thorne & Company, Inc., Los Angeles, Calif., has recently opened an office in the Mills Building, San Francisco. Alfred R. Edwards will be in charge of the office. The company handles electrical supplies, railway equipment, steel products and valves.

Square D Company has recently prepared a folder designed for distribution among consumers. The folder is in the shape of a switch and when the "switch cover" is opened descriptive matter concerning the switch is brought to view.

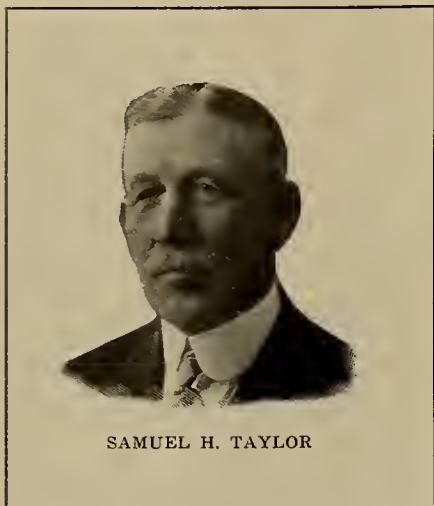
W. Wesley Hicks, San Francisco, Calif., has brought out a new type of electric water heater designed for use where continuous hot water is desired but in limited quantity. The heater is made in either two or four gallons size as desired, and is of 600 watts capacity. It is so designed that it may be placed under a sink or basin, the plumbing connections being made by means of slip-joints. The heater is applicable to a wide range of service.

The **Weston Electrical Instrument Company**, Newark, N. J., has recently brought out a complete line of rectangular-shaped instruments, including d.c. voltmeters and ammeters, for use on switchboards controlling a.c. machines. All the instruments of the group have uniform case size dimensions—5¼ in. wide and 6 in. high. It is claimed that the size affords a remarkable saving in space over the round pattern instruments. In the case of the rectangular instrument, four may be laterally accommodated on a 24-in. panel, whereas the round pattern instruments require a 32-in. panel and a greater vertical space. The ratio of the space is approximately five to nine in favor of the rectangular case. A triplex ammeter is also included in the new line and contributes to the saving of space where an ammeter is required for each phase. The face or scale of the new type instrument is no smaller than that formerly on the round pattern and the scale opening is larger.

The **Paine Company**, Chicago, Ill., manufacturer of hardware, electrical and plumbing supplies, has recently moved from 1742 Van Buren Street to 2951 Carroll Avenue, in that city. The new quarters are larger than those formerly occupied by the company and it is the company's belief that it will be better able to serve its customers.

Personals

Samuel H. Taylor, secretary of the Pacific Coast Electrical Association and Pacific Coast representative of the Society for Electrical Development, has recently completed fifty years of service in the electrical business. Mr. Taylor was born in Northampton, Mass., and in 1874 entered the employ of the Western Union Telegraph Company in that



SAMUEL H. TAYLOR

city as messenger boy. He was later made manager of the New Britain, Conn., office of the company and held that position until 1883. Following a severe illness in that year he took a vacation of several months and in November joined the force of the Thompson-Houston Company at Lynn, Mass. In March of 1884 Mr. Taylor was sent to Sacramento, Calif., to set up and demonstrate a generating set of twenty-five lamps capacity, this machine being designed for the operation of series arc lamps. In 1884 Mr. Taylor also installed a similar machine in Oakland and at that time formed an acquaintance with the late John A. Britton which acquaintance resulted in a friendship continuing until Mr. Britton's death. Under Mr. Taylor's direction an exhibit of the Thompson-Houston machine was held at the Mechanics' Fair in San Francisco in 1884 and the first gold medal ever presented to his company was awarded at that time. Various other plants were sold and installed by Mr. Taylor during the ensuing years until, in 1890, he equipped the old San Jose and Santa Clara Railroad. Shortly after this installation Mr. Taylor left the Thompson-Houston Company and engaged in different enterprises until 1897 when he joined the staff of the Rieger and Atwater Company, Inc., jobbers of railway supplies. This firm later became the Electric Railway & Manufacturers' Supply Company. Mr. Taylor remained the head of this latter company until 1920 when the firm became a part of the Westinghouse Electric & Manufacturing Company's distributing organization. Since his retirement from the merchandising field Mr. Taylor has been the executive sec-

retary of the Pacific Coast Electrical Association and has given freely of his time for the constructive work of that organization.

Fred A. Mulvaney on April 1 left the employ of the Pacific States Electric Company at Portland, Ore., and entered the manufacturing business of the Electric Sales Service Company of Berkeley, Calif., for which company he will be sales manager.

F. R. George, engineer of operations of the Pacific Gas and Electric Company, San Francisco, Calif., spoke recently before the Oakland Electric Club on the subject, "The Story of Developing Radio in Power Dispatching."

H. O. Adams, in charge of central station sales of the Electric Vacuum Cleaner Company, Cleveland, Ohio, is visiting the Pacific Coast in the interests of his firm.

L. B. Gawan, of the Utah Power & Light Company, Salt Lake City, Utah, recently spoke before the meeting of the Rocky Mountain Electrical Cooperative League held in Salt Lake City. He told of the work of the lighting service bureau and of the results that had been achieved during the past year.

A. J. Calloway of the Western Electric Company, Salt Lake City, Utah, has returned from an extended trip during which he visited Boise, Idaho; Portland, Ore.; San Francisco, Calif., and Del Monte where he attended the Pacific Coast Electrical Supply Jobbers' Association meeting and also a conference of Western Electric Company managers and sales managers.

G. H. Pythian, of Chicago, Ill., contracting engineer, will take charge of the construction of the new plant at North Bend for the Mountain States Power Company. He will remain on the job until the plant is entirely completed.

M. P. Canon of Latourette-Fical Company and C. V. Schneider of the Electrical Supply Company were among those from Sacramento, Calif., who attended the meeting of the California State Association of Electrical Contractors and Dealers recently held in Stockton.

H. F. Dicke, general manager of the Utah Light & Traction Company of Salt Lake City, Utah, and vice-president of the Salt Lake City Chamber of Commerce, has been named national councillor of the organization to attend the twelfth annual meeting of the representatives of Chambers of Commerce at Cleveland, Ohio, from May 5 to 12. The major organization is known as the United States Chamber of Commerce and represents more than a thousand community organizations.

T. M. Simpson and H. H. Dailey of the Majestic Electric Appliance Company, Inc., San Francisco, Calif., were recent Los Angeles visitors.

Hal R. Drew, Delamar Apartments, Seattle, Wash., has just been appointed Northwestern representative for the Square D Company of Detroit, Mich., with headquarters at Seattle.

Ralph Cake, who has been employed for the last year and a half by the Pacific Power & Light Company, Portland, Ore., as transmission engineer, has been appointed salesman for the Pacific States Electric Company at Portland.

F. J. Coates, of Golden, B. C., has been appointed electrical engineer to the city of Nelson, B. C.

John J. Cooper, general manager of the Mountain Electric Company, Denver, Colo., and past chairman of the Electrical Cooperative League in that city, presided at the entertainment given by that organization for members, employees, and their families, on April 4.

H. S. Thane, of the Missoula Light & Water Company, Missoula, Mont., is chairman of the newly formed lighting bureau of the Northwest Electric Light and Power Association. J. S. Groo, of the Northwestern Electric Company, Portland, Ore.; V. H. Moon, of the Pacific Power & Light Company, Portland; F. H. Murphy, of the Portland Railway, Light & Power Company, Portland, and L. B. Gawan, of the Utah Power & Light Company, Salt Lake City, Utah, are the other members of the bureau.

J. C. Hobrecht, of the J. C. Hobrecht Company, Sacramento, Calif., was among those attending the second district convention of the Rotary Club recently held in San Francisco.

Alba H. Warren, manager of the El Paso Electric Railway Company, the El Paso & Juarez Traction Company, and the Rio Grande Valley Traction Company of El Paso, Texas, and Juarez, Mexico, has recently been elected president of the El Paso Chamber of Commerce. Mr. Warren graduated from Worcester Polytechnic Institute in 1895 and entered the service of Stone & Webster, Inc., in 1900. He has served a number of companies under the Stone & Webster management for these twenty-four years, holding various positions. In addition to his commercial duties, he finds time to help in many civic activities. At the present time he is president of the Associated Charities and a director of the Gateway Club, which is putting over a \$150,000 national advertising campaign for the people of El Paso. Mr. Warren has



ALBA H. WARREN

through innumerable channels thoroughly sold his organization to the people of the community to the end that it is looked upon as the most potent and most beneficial influence in the upbuilding of the city. In all community drives he takes an active part and if something big in a civic way is to be done, he is invariably called upon.

A. S. Moody, Los Angeles, Calif., manager of the General Electric Company, recently spent several days in Portland, Ore., where he was formerly assistant Northwest manager of the General Electric Company.

J. W. Powelson, president and chief engineer of Electrahot Appliances, Inc., Minneapolis, Minn., is in San Francisco, Calif. Mr. Powelson will visit the entire Pacific Coast before returning to his factory. Arthur Elston, 77 O'Farrell Street, San Francisco, Calif., is the California representative of the company and R. M. Burton, Alaska Building, Seattle, Wash., represents them in the Northwest.

Ernest L. Dee, of the Edison Lamp Works, Salt Lake City, Utah, recently attended a meeting of the district managers of his company held in San Francisco, Calif.

W. C. Yates, manager, industrial control sales, H. E. Smeltzer, insulator specialist, and E. D. Harrington, elevator specialist, of the General Electric Company, Schenectady, New York, were recent Pacific Coast visitors, stopping at Los Angeles, Calif., for conference with their local representatives.

W. Eckley of the General Electric Company, San Francisco, Calif., who is resident agent at Visalia, was a recent Los Angeles visitor.

William E. Morgan has just been elected president of the newly organized Portland Electrical Contractors' and Dealers' Association. Mr. Morgan moved to Portland, Ore., about a year and a half ago from Pittsburgh, Pa., where he had spent ten years in the



WILLIAM E. MORGAN

electrical contracting business. When he first arrived in Portland he joined the firm of J. C. English Company and later became a licensed contractor. Some time thereafter he formed the firm of Morgan and Galloway. Largely due to his excellent work, about eighty per cent of the Portland contractors have joined the new association.

E. C. Connolly, of the Conlon Corporation, Chicago, Ill., is in San Francisco, Calif., on business for his firm. Mr. Connolly will visit other Pacific Coast cities before returning to Chicago.

Earl S. Condon, for several years outside engineer for the Pacific Telephone & Telegraph Company, Los Angeles, Calif., has been made manager of the branch newly opened in that city by Maydwell & Hartzell, Inc., San Francisco.

R. H. Ballard, vice-president and general manager, Southern California Edison Company, Los Angeles, Calif., and A. B. West, president, Southern Sierras Power Company, Riverside, were recent visitors in Washington, D. C., where they appeared before the congressional committee investigating the development of the Colorado River.

W. S. Sultan, electrical engineer of the Globe Light & Power Company of Globe, Ariz., was a recent Los Angeles, Calif., visitor.

W. A. Porterfield, general sales manager, Union Metal Manufacturing Company, Canton, Ohio, manufacturers of Union metal standards for street lighting, was a recent Los Angeles, Calif., visitor. While in Los Angeles Mr. Porterfield inspected the new Hollywood lighting system in which Union metal standards were used.

Milan R. Bump, chief engineer of Henry L. Doherty & Company and chairman of the Joint Committee for Business Development, and Paul R. Jones, auditor of Henry L. Doherty & Company, both with headquarters in New York City, were the guests of honor at a dinner held in Denver April 1 by executives of the Public Service Company of Colorado. On his visit to Denver Mr. Bump made arrangements for relocating his family in that city.

Gene Garcia, sales manager of the lamp division, Pacific States Electric Company, with headquarters in San Francisco, Calif., was recently in Los Angeles conferring with the local representatives.

W. F. Brainerd has been appointed field representative of the California Electrical Cooperative Campaign in southern California. Mr. Brainerd was formerly in the employ of the Campaign and left in 1921 to join the force of the Valley Electrical Supply Company, Fresno. Shortly afterwards he left to become Canadian sales manager of the Sun-Maid Raisin Growers' Association which position he held until he left to become New York district sales manager of the Dairymen's League Cooperative Association, Inc.

Clare N. Stannard, vice-president and general manager, J. E. Loiseau, secretary, V. L. Board, general superintendent, and Roy G. Munroe, assistant commercial manager, of the Public Service Company of Colorado at Denver, Colo., attended a meeting of Doherty company executives in New York City recently at which time major problems in connection with the company's activities in the mountain region were discussed.

George E. Flannigan has resigned his position as director of publicity and public relations of the western division of the Public Service Company at Boulder, Colo., to become secretary of the retail merchants' bureau of the Denver Civic & Commercial Association, succeeding George E. Collison who was recently elected general secretary and business manager of the Denver association. Mr. Flannigan was formerly secretary of the Colorado Public Utilities Commission.

E. C. Headrick, representative of the mountain division on the executive committee of the Association of Electra-gists, International, and a prominent contractor-dealer in Denver, Colo., attended the semi-annual meeting of the committee and the eastern division convention of the association in New York City, March 17-19.

James W. Ryall, known to the electrical industry of the entire mountain region and prominent in jobbing circles for a number of years, is one of the partners of the B & R Electrical Supply Company in Denver, Colo. Mr. Ryall, a native of Ireland, arrived in the United States in 1904 and secured employment with the Westinghouse-Church-Kerr Company at Boston as a construction specialist. It was through his connections with that company that he went to Colorado in 1907 for the construction of the steam plant at Lafayette. The lure of the West proved so great that he stayed at the new plant as purchasing agent for the Northern



JAMES W. RYALL

Colorado Power Company. In 1914 he resigned to accept a similar position with the Trinidad (Colo.) Electric Transmission, Railway & Gas Company. In 1916 he returned to Denver with the Mountain States Machinery Company for a year until he became associated with the sales force of the Mine & Smelter Supply Company. In 1920 he was appointed manager of the electrical department of that organization which position he held until his recent resignation to become secretary and treasurer of the new jobbing concern. Mr. Ryall has been active in National Electric Light Association work in the mountain section and for two years was a member of the Advisory Board of the Electrical Cooperative League of Denver.

Obituary

Edward S. Brooks, vice-president and general manager of the Union Pacific Coal Company, Rock Springs, Wyo., died on March 21. Mr. Brooks had been identified with his company for over thirty years.

J. S. Simpson, auditor of The Washington Water Power Company, Spokane, Wash., died suddenly of apoplexy on April 4. Mr. Simpson became associated with the company, as auditor, in 1918.

Walter Neumuller, secretary of the New York Edison Company, New York City, and treasurer of the National Electric Light Association, died April 9 after an illness of two weeks. The immediate cause of death was pneumonia.

Trade Outlook

San Francisco

Improvement has been shown in the electrical industry, as a whole, during the last two weeks. Electrical supplies of all kinds are in good demand, dealers in radio equipment reporting some difficulty in obtaining sufficient stock to meet requirements.

Wholesale houses state their business is fairly satisfactory, although there is marked conservatism in buying. The recent general rains have done much to stimulate activity, but some reaction is being experienced on account of the hoof and mouth epidemic among the cattle in the country districts.

Retail sales are fair in volume. The jewelry business is about normal, although feeling somewhat the effect of conservative buying. Installment collections are good. Credit in general is being extended with more caution than usual.

Exporters report increased volume of business to the Far East and to Mexico.

There is no marked degree of unemployment, factory labor payrolls showing a normal increase. Building continues at a good rate.

For the first quarter of the year bank clearings showed a gain of \$8,700,000. Collections are reported fair to good.

Los Angeles

General business conditions in this section are a trifle slow with a slight over-supply of labor. Real estate activity has slowed up somewhat during the first of the year and this in turn has caused a slowing up in other lines. The rains of the past few weeks have done their share in stimulating the activity which is expected during the coming month.

The sale of wholesale electrical supplies continues good. Business is somewhat slower than it was prior to the first of the year, but there are indications at the present time of a change for the better. Radio sales have increased during the past week and bid fair far to outdo last month. This is true both in the sale of new sets and supplies, the only drawback being the scarcity of equipment.

During the last two weeks of March there were issued 2,363 building permits valued at \$8,757,888 as compared with 2,682 permits with a valuation of \$8,641,848 for the corresponding period a year ago. Bank clearings for the month of March amounted to \$644,338,000 as compared to \$579,770,000 for the same month in 1923.

Salt Lake City

A new record for the month of March was established in building permits in Salt Lake City, both as to amount and valuation. A large number of these permits was for the building of new homes, which indicates a growing tendency for people to own their homes.

In practically all lines of business there is continued improvement. At the convention of electrical men of the

Inter-mountain section, held in Salt Lake City on April 4, the keynote was decidedly that of optimism, all branches of the industry looking forward to a much better year than last.

Healthy conditions continue to prevail in the mining industry. General industrial conditions appear to be satisfactory, and with the advent of spring, which means considerable increase in building activity, very little unemployment is anticipated.

March washing machine campaigns have netted satisfactory results. The Utah Power & Light Company sold 1,154 machines during the month, which is an indication in itself that the buying public is in a favorable state of mind.

Collections continue to improve.

Seattle

Reports from all parts of the state indicate a satisfactory condition existing in practically all lines of industry, with a noticeable increase in employment and active labor demand.

Production, sales and shipments in the lumber industry reflect a healthier condition of the market during the past two weeks, with sales showing a greatly increased volume over production. Demand from California, Eastern points and for water delivery has increased.

Trade, wholesale and retail, is making good progress. The retailer is now in the midst of the spring harvest season, and the volume of department store business is considerably in excess of a similar period last year. The weather has been conducive to early spring buying, which is expected to continue until well into the summer.

Volume of sales of schedule materials, wiring devices and household appliances during the past two weeks compares favorably with former weeks of the month, prominent jobbing firms announce. Sales of heavier equipment and materials used by central stations and telephone companies are holding up well, and announced plans for power development work in the state indicate that this demand will increase. Stocks are in good condition, with replacements easy. Prices are holding at former announced levels, with few minor exceptions. Collections are satisfactory.

Denver

Substantial improvement in trade and industrial activity is noted. This is especially evidenced in wholesale lines. Retail merchants in the larger cities of the region have not entirely recovered from the after holiday buying slump. In a general way, the electrical industry is faring far better than many other staple lines of business.

Oil is booming the northern part of the state. Increased activity is noted every day, and Denver jobbers are supplying a large portion of the requirements in the field. Several nationally known producing companies have recently opened offices here, and this fact

presages considerable confidence in Denver as an oil center.

With building permits totaling \$2,118-850 for the month of March, a new high record for the present year has been established exceeding the record for the first quarter of 1923 by over six hundred thousand dollars. Total permits thus far this year amount to \$4,822,900. Both for the month of March and for the first quarter, Denver led all cities in the tenth federal reserve district in the amount of new building.

Spokane

General conditions are better than they have been in years and the feeling of optimism is very pronounced.

For the first quarter building permits were \$665,348, a gain of 50 per cent over the same period of 1923. The Northern Pacific Railway will spend \$450,000 on track work on the Idaho division from Paradise, Montana, to Cheney, Washington. The Great Northern Railway will spend \$175,000 in improving telegraph lines in the vicinity of Spokane. The extensive program of improvements in transmission lines of The Washington Water Power Company involving \$2,000,000 is already under way, and a large amount of line material has been ordered.

All reports show steady gains in packing and dairy products.

Mining activities continue to increase, due to high price of lead and zinc. Announcements are made almost daily regarding improvements and the re-opening of old properties in Idaho, Washington and British Columbia.

In a campaign on electric ranges started April 1 by The Washington Water Power Company 35 ranges were sold in the first five days. One builder has announced the construction of \$100,000 worth of new homes, all of which will be wired for electric ranges.

Portland

The total value of building permits issued during March, 1924, was \$3,247,290, nearly a half million dollars over those issued last March. This gain was nearly all due to the increase in home construction. In consequence, the sale of wiring supplies and fixtures has been stimulated.

There has been no general advance in building material costs, which are now about where they were a year ago. Dealers in building supplies report adequate stocks on hand.

Business firms report a steady revival of inquiries and sales with the approach of summer. Postal receipts and bank clearings both show substantial gains over March of last year.

The demand for lumber is only fair. Unfavorable weather conditions in large sections of the country are given as the cause. Retailers are marking time and production has fallen still further, most of the large mills running on a part time basis. A further decline is expected.

According to the Merchants Exchange, cargo shipments from Portland to the Atlantic coast ports during March reached practically 50,000,000 lb. as compared with 34,000,000 lb. a year ago. Cargo receipts at Portland from the North Atlantic ports showed a similar increase.

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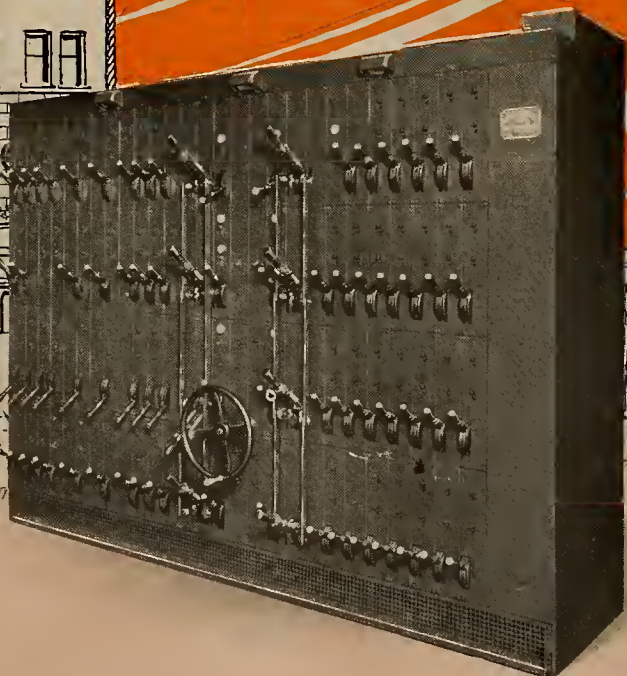
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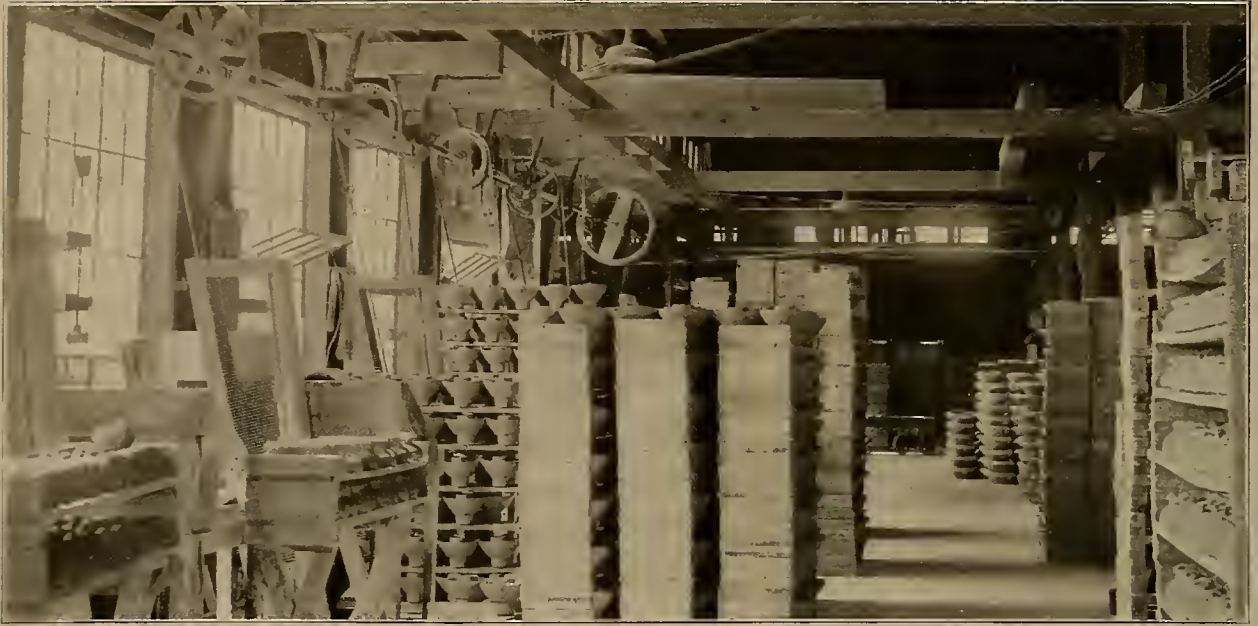
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The Convention Issue June 1

AS the time approaches for the annual convention of the Pacific Coast Electrical Association, our readers will be interested in learning of the plans of the Journal of Electricity for bringing the convention to them through the columns of this paper.

The time—June 16 to 20 next; the place—Hotel Coronado, near San Diego, California, and the publication—Journal of Electricity, in accordance with the usual custom.

There will be the pre-convention issue, June 1. In this number there will be published all of the formal convention papers, the reports of all the committees carrying the results of their study and investigation of every conceivable phase of the electrical industry, both technical and commercial, during the year just past.

Every member of the Association will receive his copy, as well as such readers of the Journal as are not members. Those who will attend the Convention are thus afforded an opportunity to study the reports and prepare their discussion for presentation at the section meetings. Those who desire to participate in the discussions, but who are unable to attend the Convention, may prepare their discussions and forward them to the Committee Chairmen who will present them by proxy.

Through this service, the voice of this assemblage will be heard throughout the entire eleven Western states. It is by far the most important event of the year, electrically, and, for the same reason, the June 1 issue of the Journal is perhaps of greater service value than any other. On this account, the selling section attracts more than ordinary interest for the reason that the story of the apparatus, appliances and supplies ties directly into the text of the Committee reports. In effect, the Committee reports tell what has been done, what results have been achieved, with the application of the apparatus, appliances and supplies set forth in the selling section.

To all our clientele, readers and advertisers, the June 1 issue next presents an exceptional opportunity.

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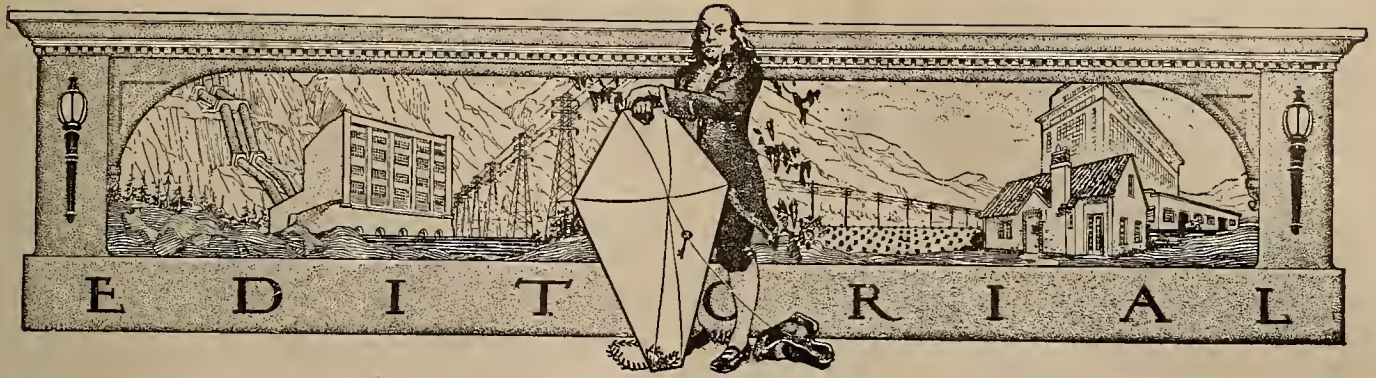
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Again the California Water and Power Act

LORD NORTHCLIFFE once said that his long career as a publisher had taught him one cardinal principle—the power of repetition. The American advertising man has developed this same thought into a slogan of his own, namely, “Tell the public, and tell ’em again, and again, and then once again.” It would seem that if the proposed California Water and Power Act is to be defeated for good and always, the electrical industry must gird up its loins and start a campaign of reiteration of the arguments used in 1922 against this vicious and destructive measure.

DEFEATED by the voters by the overwhelming majority of 353,849, the Act is with us again,—same model, same paint, same horsepower, same salesmen. Until it becomes so monotonous as to attain the status of a Bryan presidential campaign, the concerted efforts of the electrical industry must be directed toward giving the public the facts.

AS a gentle reminder to those who have forgotten the intensity of the campaign of 1922, we publish on another page of this issue a review of the 1924 Act together with a critical analysis of its destructive character. Here is a measure purporting to be for the benefit of the people, which, if passed, would set up a fund of \$500,000,000 offering vast opportunities

for improper manipulation. A business which already represents an investment of close to a billion dollars would be made subject to the whims and caprices of political control. A board of five administrators, politically appointed, changing with each administration, subject to no supervision save the vagaries of the recall, would have unrestricted license in spending the taxpayers’ money as they saw fit. Pages could be filled pointing out many more such obvious weaknesses as those stated above.

TODAY, in California and in every other state of the Union, the water and power business is being efficiently managed by private enterprise subject to sound public regulation. The government can regulate industry but it must not enter into the field as a competitor of citizens or as an unrestricted and unregulated monopoly.

THE proponents of the Water and Power Act do not admit defeat. Despite the will of the people as voiced in the last election, they are again in the field with colors flying. On account of their previous reverse, they will redouble their efforts this year. Is the electrical industry to sit back and rest on the laurels of its last victory? Forewarned is forearmed and an attacking army is three times victorious. Let us start building our trenches today.

In the Kingdom of the Blind A One-Eyed Man Is King

IT is not difficult, in fact it is entirely too easy, to write or enunciate a quantity of words, and say little or nothing. It is almost a stroke of genius to say a few words so pregnant with meaning that they capture the imagination and leave an impression that lasts a lifetime. "Millions for defense, and not one cent for tribute," electrified the American people and swayed Congress from indecision to action that had a profound influence upon the history of this country. "This Nation cannot exist half-slave and half-free," in a few words expressed more than volumes during the crisis of the Civil War. "Self-determination" stirred all the peoples of Europe, even though it has failed of realization.

Now, at the beginning of the second campaign for the defense of private initiative and ownership of public utilities under state regulation in California, comes Frank G. Tyrrell of Los Angeles with his article in this issue on "The Los Angeles Experiment in Municipal Power." He has given to the people of California a phrase that characterizes the whole glittering dream of state ownership, operation and control, as "The passionate pursuit of the second-best."

Why second-best? The school teacher conducting his class in economics a few years hence, will say, "Children, let me tell you of South Dakota, of the government operation of railroads during the Great War, of the Province of Ontario, yes, and of the City of Los Angeles." South Dakota has abandoned its passionate pursuit of the second-best, after a failure that almost reached the proportions of a disaster. The result of the government experiment in the second-best is too recent an event in history to require comment. An investigation by a whitewashing committee of the affairs of the Ontario Hydro-electric Power Commission disclosed the fact that the whitewash was not thick enough to cover the truth that here again is further proof that no more than a rather poor second-best was the most that could be said for it. Mr. Tyrrell himself presents facts and figures that should be a lesson to all of us, a story of specious claims of profits that have not been realized, of raid after raid upon the pockets of the taxpayers, demands for more and more millions in the shape of bonds, and further and further claims of great things to be accomplished—manana.

It is truly a case of the blind leading the blind, in the passionate pursuit of the second-best.

Put the Wife on the Payroll

LIVES there a woman with soul so dead that she would not like to see her husband increase his monthly income by \$200, or who would not like to see him make a greater success in the business in which he has elected to gain a livelihood? And is there a business which affords a wife or a daughter a greater opportunity to help a husband or a father than the electrical business? Yet how many wives of men in the electrical industry know anything about the work which their husbands are doing?

How many of them cook on electric ranges and are sufficiently familiar with the advantages of electric cookery to urge their friends to try it? How many of them have ever discussed the conveniences of labor-saving electric appliances with fellow members of a club? How many of them know the arguments against state or municipal ownership of electric utilities and can comprehensively discuss this subject with friends?

We know of the wife of an electrical contractor-dealer who has furnished her husband with scores of leads which have resulted in the sale of washing machines and vacuum cleaners. He contends that she is the best salesman his business has. We also have heard of the wife of a central station commercial man who has induced several of her friends to purchase electric ranges. Further than that we know of the wife of a central station executive who talked to hundreds of club women against the California Water and Power Act in 1922 and the daughter of another who has sold many shares of stock in her father's company to her friends. These women are the exceptions. Yet they show what can be done.

Convention time is approaching. Many of the men who attend conventions this summer will bring their wives. Elaborate plans are made to entertain the ladies while the husbands are attending the convention sessions. They are putting on contests and teas, automobile rides and bridge parties, luncheons and theater parties. Would it not be possible to get the women together at a luncheon meeting and tell them something of the romance and the possibilities of the electrical business? Surely among the electrical fraternity there are men with sufficient knowledge of the electrical business to give these women a worthwhile and yet entertaining message. Here is an opportunity that has been overlooked in the past. It is well worth cultivating.

Not Even Politicians Can Give Something for Nothing

PROPOSERS of municipal ownership in Washington have filed with the secretary of state an initiative measure known as the Bone bill giving municipalities engaged in the power business the right to distribute and sell electric energy outside their corporate limits. The bill provides further that income derived from such sale shall be tax free and that cities shall have the right to condemn the property and lines of private companies as they see fit. While not as vicious as the Erickson measure, which has been abandoned for the time being, the Bone bill is the entering wedge for ultimate state ownership.

An attempt is being made to have the measure labeled the "Bone Free Power Bill." Here is a subtle politico-psychologic move designed to instill in some portion of the public mind the belief that the people will get something for nothing. The propagandists would have the unthinking believe that a city, a district or the state as a whole can go into the power business, develop projects, distribute energy and drive out private competition, all without a penny of cost to the public. Everything, including the original expenditure, is to come out of "profits."

The voters in Washington are not likely to be deluded by such misleading arguments. Seattle's experience in the power business ought to furnish some measure of refutation to the theory that the only thing necessary for success is faith, hope and the ability to borrow money and pay interest by increasing taxes. Seattle citizens are not only paying the highest taxes of any city on the Pacific Coast, but they are paying high fares for riding on the municipally operated street railways and are getting better electric service from a privately owned company at the same rate that the city is charging.

The Bone bill may get some support but not because anyone has been deceived by calling it a "free power" bill. The people of Washington, and especially those residing in Seattle, know better.

Gardens at Utility Properties Win National Commendation

IN an article discussing the activities of the National Garden Association which is attempting to secure a better grade of gardening throughout the country, the Garden Magazine for March made the following statement:

"The Pacific Power & Light Company offered prizes for the best improvements in the company's grounds at each of its 60 different stations in Oregon, Washington and Idaho. The results demonstrated clearly that public utility grounds can be made beautiful and attractive—a hint of value to every large manufacturing company."

To those who are familiar with the properties of this company the above statement has particular significance. To those who are not we promise a treat if they are ever afforded an opportunity to visit the properties. Substations have green lawns, flowers, trees, shrubs and vines all artistically arranged, hydro plants have parked grounds and gas plants are as clean and as immaculate as it is possible to make them. Employees who have done the work in their spare time have developed a keen sense of pride in their company and its properties. Citizens of the community in which the stations are situated point out the properties to visitors as if they were city parks. They are proud of the company which furnishes them electric or gas service.

The plan followed by the Pacific Power & Light Company is highly commendable and worthy of emulation by other public utilities.

Electric Trucks as a Traffic Aid

ELECTRICITY is afforded an unusual opportunity by the traffic situation in our larger cities, where the congestion is rapidly approaching the point where only those vehicles that are positive in operation will be permitted on the streets. Horses must disappear and motor vehicles subject to the vagaries of inexperienced or careless handling will be in great disfavor with the authorities. Electric trucks, with their ease of control and their positive operation, together with their rapid acceleration, offer a solution, in part at least, of the traffic problem and should

serve to reduce traffic congestion. The delay incident to stalled motors and to the intricacies of gasoline motor control in the hands of those who are unfamiliar with their technicalities will be overcome by the extensive use of electric trucks and the loss of public time will be minimized.

Heads of large transportation companies have been convinced already of the desirability of electric truck transportation. One company now owns and operates a fleet of 1,550 electric vehicles. The police departments of cities look with favor on the electric vehicle as a help in the solution of the traffic problem. Economically, it has been proved that transportation costs have been lowered by the use of electric trucks.

Baling Wire Methods in Rural Electrical Installations

THE statement is made and quite truthfully, that the Western farmer is a "Jack-of-all-trades." He must be if he is to be successful in a venture in which he is pitted against nature and the elements. The remark is made that a farmer can take a piece of baling wire and repair anything from a tractor to a broken fence. Of late it would seem that the farmer is applying baling wire methods to the installation and use of electrical equipment and appliances.

Not subject to supervision or standards, ignorant of the procedure necessary for safety and likely to be guided by cost rather than quality in his choice of materials and equipment, he is creating a potential hazard out of an agency designed to be his greatest ally. Properly applied, electricity will prove one of his greatest boons. Misapplied, it is a hazard to both life and property. It is safe to say that in the majority of installations made by the farmer himself, baling wire methods are followed, and a potential hazard created which at any time may become real with subsequent loss and damage.

On another page of this issue Claude W. Mitchell of the Board of Fire Underwriters of the Pacific outlines the need for electrical inspection in rural districts. Mr. Mitchell points out that in cities and towns inspection exists, but that outside the corporate limits of municipalities there is no agency for determining whether or not an electrical installation is safe.

It would seem that here is an opportunity for the electrical industry in cooperation with the insurance people to bring about the much needed protection. Agitation can be started for legislation definitely assigning the duty of properly inspecting rural electrical installations to state or county authorities. Especially is this needed in the Western states where electricity is so universally used on the farms.

Further than this, the central stations, with which the farmer must necessarily come in contact in securing service, should impress upon him the necessity of having the installation made by someone thoroughly competent to see that the requirements of the National Electrical Code are carried out, preferably by a legitimate electrical contractor.

CURRENT COMMENT



Constant reference is made to various municipally operated street railway systems by the advocates of municipal ownership of the light and power business.

Municipally Owned Street Railway Lines

Particularly do they point with pride to the record made by Detroit with its railways. The Los Angeles Times, in a recent editorial, makes some interesting

comparisons between the Detroit city-owned system and the privately owned and operated system in the southern California city. Excerpts from the editorial follow:

Los Angeles and Detroit have about the same street railway mileage. In Los Angeles the lines are owned and operated by a private corporation; the Detroit lines are municipally owned and operated. Griffith C. Ellis, president of the Detroit Municipal Railway Commission, gave some interesting data to The Times on Sunday relating to the operation of the municipal lines in Detroit. These figures enable one

to make a comparison of the street railway service in the two municipalities.

Detroit carried more passengers to the car mile last year than Los Angeles, moving 471,000,000 passengers against 341,200,000 for this city; put nothing aside for depreciation, while the Los Angeles Railway Company was compelled by the State Railroad Commission to put aside \$1,061,000; and yet Detroit was compelled to charge a 6-cent fare, while the Los Angeles lines operated under a 5-cent fare.

Yet the Detroit street railways are said to be operated more economically and efficiently than any other municipal system in the United States. Prior to 1921 the Detroit lines were owned and operated by a private company, and a 5-cent fare was charged. The city bonded itself to take over the lines, the people expecting that the promises of the municipal-ownership propagandists of cheaper fare and a profit would be kept.

But the people were soon compelled to bond themselves for another \$10,000,000 for expansions and improvements. Then came a clamor for higher wages for the employees, for the railway was now unavoidably involved in city politics. These things, according to President Ellis, "have compelled us to raise fares from 5 cents to 6 cents, with strips selling at twelve for 50 cents, which brings the average down to about 5.55 cents."

We are far from the days when Tom Johnson of Cleveland was proclaiming that, under municipal ownership, street-car lines could be operated at a profit at 3-cent fares.

It would be unfair to say that municipal operation in Detroit has proved a failure. The people are doing their best to make it a success. Mr. Ellis says "Our chief engineer, Mr. Mayo, is getting no salary. His predecessor received \$15,000 and we expect, when Mr. Mayo is relieved of the emergency duty he is now performing, to pay his successor on a scale commensurate with what his abilities would command elsewhere. We ourselves get no pay. That, too, is a condition that cannot continue."

The Detroit street railways pay for paving between the tracks, as the railways do here. Equally important, they pay the same taxes that a private company would pay, except they pay no federal income tax. Men of means and recognized merit have volunteered their services in order to give municipal ownership a fair test. But they could not avoid the inevitable increase in the cost of service and a consequent increase in fares.

San Francisco claims to operate its street railways at a profit. But the annual report of that system is the joke of statisticians wherever it is known. The municipal system does no street paving and it pays no taxes. The Los Angeles Railway Company paid last year \$830,000 in state and federal taxes.

Why is the cost of operation higher in Detroit under municipal ownership than in Los Angeles under private ownership? Here is just one item in the cost of operation in Detroit: "For injuries and damages, \$685,000." It is plain that there was either extremely reckless operation or those who alleged injuries were able to secure highly favorable settlements.

Municipal-ownership propagandists will say that the people of Detroit paid no dividends to the owners of the street railways last year because the lines belonged to the people. But the people of Los Angeles paid no dividends to the owners of the Los Angeles Railway last year. This company has not declared a single dividend, has not paid a dollar to its stockholders in the way of profits since 1914.

Moreover, the Los Angeles Railway gave free transfers to 30 per cent of its passengers last year, while in Detroit transfers cost 1 cent each; it carried 2,811,000 school children



Bronstrup in S. F. Chronicle.

WOULD SLAYING THE BIRD INCREASE
ITS EFFICIENCY?

for 2½-cent fares, and its free list, regulated by municipal ordinances and franchise regulations, climbed up to 7,700,000. Apparently our policemen, firemen and mail carriers did considerable joy riding on the street railways last year.

Detroit has what a majority of its citizens desired, a municipally owned street-railway line. But it has also what they did not desire, but could not evade, an increase in fares from 5 to 6 cents and a bonded debt for many millions.

Certain groups of politicians and demagogues seem bent upon launching the nation into the power business despite the costly experiments with government

A New Bill for Government Ownership

in business already written into history. A group of Middle Western senators, who should know better in view of the disastrous ventures in their own states, have proposed a bill to Congress calling for the creation of a federal public service commission to develop the water power resources of the country. In commenting on this measure, the Seattle Post-Intelligencer says:

One of the most desirable pieces of legislation now claiming the attention of the country is the proposed bill of Senator Norris of Nebraska, providing for a federal public service commission to develop the water power resources of the country and sell electricity to the people AT COST.

The bill already has strong support. It was prepared cooperatively by Senators Norris, Dill, Frazier, Howell and La Follette, and Congressmen Keller, Swing, Wefald, and others.

The measure is based upon the truth that real conservation does not consist in merely withdrawing from use the people's resources, like coal, and oil, and water power. The people have the right to intelligent use of these resources. Senator Norris proposes to use the water powers intelligently.

If resources are simply withdrawn from use and locked away, as Roosevelt withdrew the oil lands of the West, there comes a revulsion of popular feeling, and we have such a crime as the general leasing act of Feb. 25, 1920, under which John Barton Payne and Albert B. Fall indulged in an orgy of giving away to private interests the nation's oil lands, too long withheld from use.

Senator Norris proposes that the water powers shall be put to work, not given away to private interests for nothing, but developed into electricity sold to the people without profit.

Senator Norris and his level-headed associates in Washington have been watching the work of the hydroelectric commission up in the Province of Ontario, popularly called "Hydro." Hydro takes the water power of Niagara Falls, turns it into electricity, and distributes it to municipal electric lighting plants through Ontario so cheaply that they sell to consumers at one-third the prices collected by corporations from New York and other American customers for current created by these same Niagara Falls.

Well, the Norris bill gives the federal public service commission a revolving fund of five hundred million dollars. This will construct plants worth many times five hundred million dollars. Users of the commission's electric current will pay a sum not only sufficient to cover the commission's operating cost, but also to repay the commission's treasury for its outlay on plants and transmission lines. These repaid funds will then be available for further water power developments.

Under the bill the commission is to be given Muscle Shoals for development, and also is to construct the Boulder Dam in the Canyon of the Colorado, designed to protect from flood the people of the Imperial Valley and supply six million horsepower for use of the people in Western states.

Any city, state or county can ask this federal public service commission to construct for it a water power development and sell the current AT COST. If the bill is passed, as it should be, we people can turn to the federal government to develop the water powers of the nation.

A more sensible view of the situation is taken by the Nogales (Ariz.) Herald, which roundly criticizes the Public Ownership League of America for advocating a similar proposal. This paper says:

The Public Ownership League of America is working for the adoption of a National Public Superpower bill. These words are large sounding and can cover a multitude of political sins.

There is nothing mysterious or super-natural about a superpower system. It is just plain everyday electric power, either developed in large plants and transmitted over long distances by wire, or it is the connecting up of individual small plants so as to enable the transmission of power for an almost endless distance.

The term "superpower" will give public ownership advocates and those desirous of establishing socialism pure and simple a handle on which to fit many of their pet schemes in attempting to secure public support. A superpower program under public ownership would involve the taxpayer in greater expenditures.

Rather than municipal, state or government ownership, The Manufacturer (Salem, Ore.) believes that the customer ownership policy of the present utilities affords a solution for the ailments which the propagandists ascribe to the electric light and power companies. In a recent editorial, this paper says:

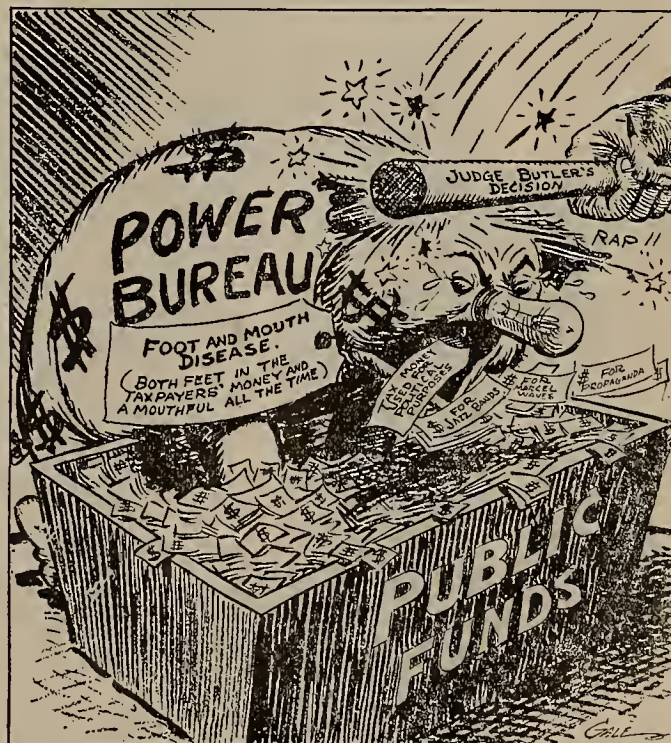
The people have a deep interest in well managed public utilities, because hundreds of thousands of consumers of light, heat, telephone, water and other forms of public service are stockholders in these utilities.

Public ownership or what may be termed political management of such properties has not proven a universal success, and thousands of mismanaged and unprofitable publicly-owned utility properties have gone back to private ownership.

Movements in states are precipitated from time to time for state-wide ownership of light and power plants, water powers and even telephone service, and even abolition of public service commissions, in the struggles for political leaders to get payroll domination.

With hundreds of thousands of utility employees under their control city politicians seek political power to get control of state governments and even power over the national congress. This is the real secret of attempted public ownership of interurban and steam railroads.

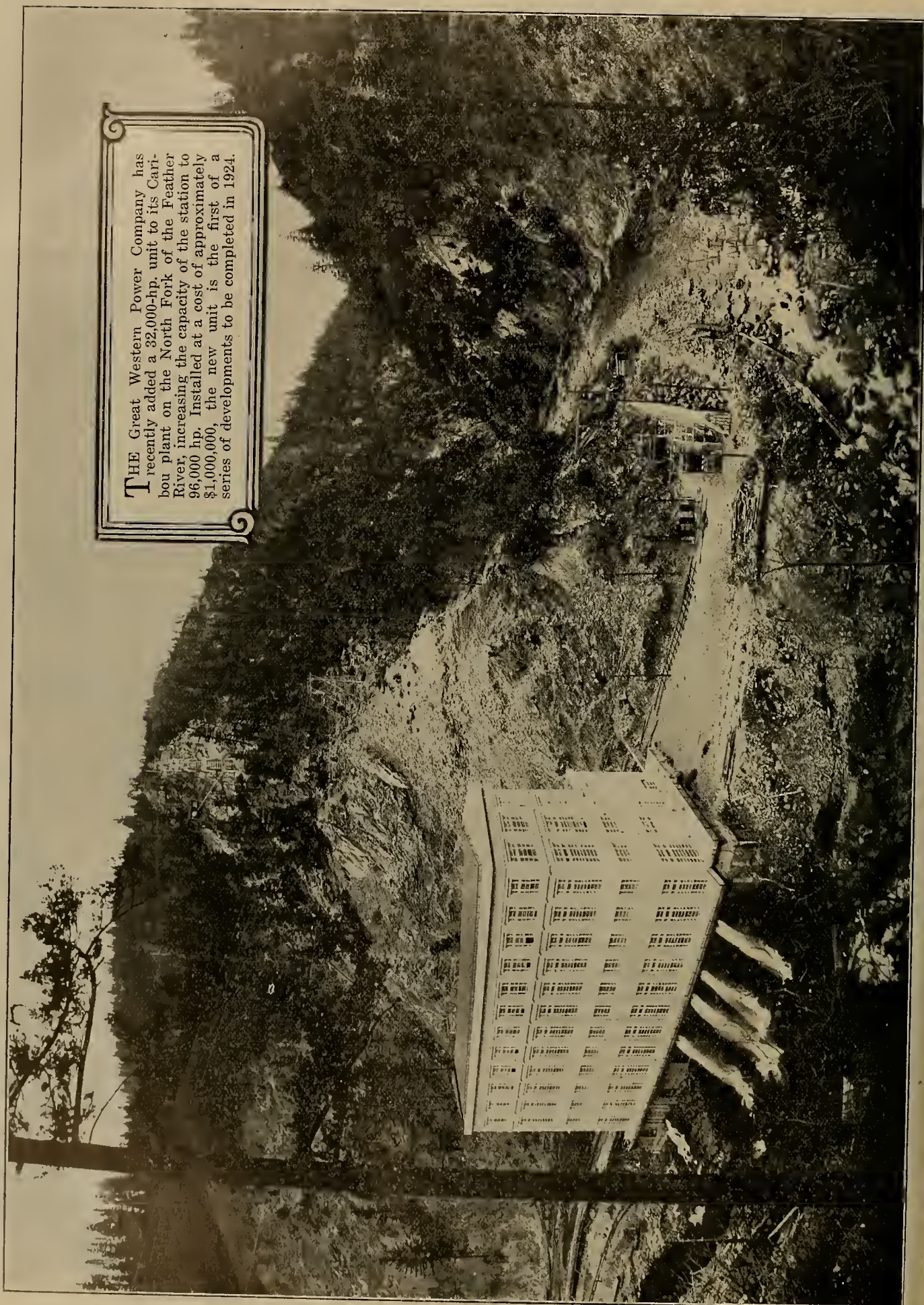
State and national regulation of public utilities is now amply provided and is giving fair satisfaction to stockholders, extending into millions of laborers and consumers, and there is no excuse for extending the grasp of state or city politicians to larger fields.



Gale in the Los Angeles Times.

CAN HE BE CURED?

THE Great Western Power Company has recently added a 32,000-hp. unit to its Caribou plant on the North Fork of the Feather River, increasing the capacity of the station to 96,000 hp. Installed at a cost of approximately \$1,000,000, the new unit is the first of a series of developments to be completed in 1924.



The Los Angeles Experiment in Municipal Power

By Frank G. Tyrrell*

Attorney-at-Law, Los Angeles, Calif.

IN the early nineteen hundreds Los Angeles went to the Owens River valley in Inyo County, Calif., for water. Dams and other structures were built at the head of the river and the water was brought by aqueduct over desert and mountain 240 miles to Los Angeles. Forty miles from Los Angeles where the water dropped down the mountains toward the coast, engineers advised that electric generators be set up and the falling water turned into power. Advocates of municipal ownership seized upon the situation to urge that the city enter the power business. And without any preliminary study of the subject, without analyzing the experience of other cities in similar projects, the city was rushed into a bond issue of three and a half million dollars.

The three and a half millions were to build a power plant and a transmission line into Los Angeles. How the power was to be disposed of was not clear. Engineers advised sale to private companies; others talked of distribution by the city itself. Probably the general belief, at least at first, was that the city would sell the power wholesale.

Some of the Promises

The proponents of municipal power were clear and emphatic in their promises of financial advantage to Los Angeles.

The Public Service Commission said (L. A. Examiner, April 11, 1910):

"We may never require another bond issue, for this one may lay an earning foundation that will itself pay for the rest of our future improvements. This great project will be completed without the expenditure of another cent, other than that voted for the work by the bond issue."

Chief Electrical Engineer Scattergood promised "a good net profit, guaranteeing against any possible taxation for aqueduct or power bonds from the beginning of operation." (L. A. Record, April 16, 1910.) One eager champion, the mayor himself, declared the proposition a "money-earner," the bond issue no burden at all, and intimated that it would not only pay for itself, but "wipe out the entire city indebtedness!" (L. A. Express, April 16, 1910.)

IN 1910 the City of Los Angeles embarked in the electric power business as a side line to the municipal water supply. To date it has spent \$23,000,000 for power development and is now seeking an additional \$21,000,000. Can the expenditures be justified? Have the people benefited? These are some of the questions Mr. Tyrrell answers in his discussion of a business which he characterizes as "the passionate pursuit of the second best."

These promises carried the bond issue. It was a phenomenal example of "frenzied finance." The city was to invest three and a half millions in a power plant and make it pay for itself, reduce taxes, and wipe out the entire city indebtedness. A truly Napoleonic feat!

What followed? The power plant and the transmission lines were not completed. Taxes were increased in 1911 to pay interest and sinking fund

charges on the bonds, and in 1914, the people were called upon to vote more bonds,—this time six and one-half millions. The cry was "the aqueduct power must be saved for the people." To do this, the city must go into the electric business "on a big scale." It must build a distribution system, wires and lines reaching all parts of the city.

The alluring promises and prophecies of 1910 were repeated. A deputy city auditor said:

"The earnings from the power plant will take care of all interest charges and make nearly a million dollars a year profit besides, and the tax rate will not be increased by the power bonds." (L. A. Record, April 29, 1914.)

An "Irish Dividend"

Again the people believed and the bonds were voted. One power plant and a transmission line were completed and a distribution system partly built. The city went into competition with the existing companies, the Southern California Edison Company and the Los Angeles Gas & Electric Corporation. And with what net result? Lighting rates were reduced a trifle, one-half cent a kilowatt-hour, but bond interest was not paid, nor was money provided for a sinking fund to pay off the bonds as they came due. On the contrary, taxes were still further increased to meet interest and sinking fund,—another "Irish dividend" for the patient taxpayer.

Before the proceeds of this second issue of six and one-half millions were fully spent, the sponsors of this municipal adventure came forward with splendid audacity, proposing still another bond issue, to provide for future growth and to buy out the two private companies. The Edison Company brought power from the mountains of Fresno and Kings Counties; the Los Angeles Gas & Electric Corpora-

*An address delivered before the San Francisco Electrical Development League, April 7, 1924.

tion generated power by steam in the City of Los Angeles. The Edison company's distribution system covered almost the entire city; the other company's a considerable part of it. The people were told that purchase of the competing companies would bring consolidation and efficiencies that would insure the revenue and the profits promised before but not realized. The lighting rate was to be further cut and taxes were to be reduced. Above all, interest was to be paid on all bonds and the bonds themselves were to be paid off as they came due.

Getting Deeper into the Hole

Twelve millions were asked for, almost twice as much as the second bond issue and nearly four times as much as the first. By this time there were some unbelievers and the bonds did not carry. They were put up again, this time for thirteen and a half millions and in 1919 the people voted them, as much to protect their previous investment as for any other reason. This made the city's bond issues for power, nine years after the project started, twenty-three and a half million dollars.

Then of course came litigation with the private companies. At first both companies resisted, but the Edison finding that it had a wide market outside the city limits and that it could make a favorable wholesale contract with the city, capitulated and sold out. The city took possession in 1922. The Los Angeles Gas & Electric Corporation kept on fighting and now, five years later, is still in full possession of its properties and hotly competing with the city for both light and power. It has about one-third of the business. Condemnation proceedings against the Los Angeles company have not yet even a good start and probably could not be completed in another five years if the city had money ready to buy it out,—which it has not.

And here let me remind you that the thirteen and a half millions was to give Los Angeles the last word in a united, comprehensive distribution system. It was eventually to free Los Angeles of the private companies. It was to make earnings that would pay interest on the bonds, all of them; earnings that would pay the bonds themselves as they came due. It was to reduce rates and make profits for the taxpayer.

These promises of 1919, like those that went before them, have not been kept. One of the private companies is still unpurchased. Taxes have not been reduced. Rates have been raised rather than reduced and are higher today than before Los Angeles went into the power business.

Thirty-five Millions—a Mere Trifle

Last year a fourth bond issue, greater in amount than all the others combined, was placed before the people. It was for thirty-five million dollars, ten times the amount of the first issue.

Again there were generous promises, but the people were skeptical, although a new color of romance was invoked, that of bringing water and power from the untamed Colorado River, water for millions, and power for a great industrial common-

wealth. This time the people did not accept the promises. When the votes were counted the verdict was "NO." The people had decided not to add thirty-five millions to the twenty-three and a half millions already voted.

But the persistent proponents of public ownership are not discouraged. They are back again with a request for more bonds. At first, early this year, they asked for thirty millions, twenty-four millions for extensions and additions and six for a steam generating station. Then came the Chamber of Commerce and suggested that they be content with twenty-one millions. They have accepted the suggestion and have cut out the six millions for a steam plant and dropped three millions from the amount first asked for extensions and additions. The twenty-one millions are to be spent at the rate of seven million a year for the next three years.

More Promises and More Bonds

Thus far there has been no promise of reduced rates, but the same old promises of profits are there, savings to be made by stopping the wholesale purchase of power from the Edison company, savings to be made by greater efficiencies in operation, increased earnings for bond interest and for paying off the bonds themselves. Again there is the plea to make good on the investment; to arm the Power Bureau to "carry on" as befits the growth of Los Angeles.

How will this bond issue come out? I hesitate to answer. Early in April the Board of Supervisors has had the temerity to propose for county flood control thirty-five millions to be voted on at the same election, May 6, 1924. This in spite of objections by the Power Bureau who see their plans thereby further jeopardized. Nor is this all. The streets of Los Angeles are full of circulars from a "Citizens' Bond Committee," which say:

"Bond issues to the amount of \$102,840,000 are to be voted upon at elections in May and June.

"This avalanche of bonds threatens to wipe out the bonding credit of Los Angeles. Already the limit has been passed for non-revenue producing bonds and there is a scant margin left for revenue-producing bonds.

"The only way to provide new credit is to increase the assessed valuation of taxable property—and that increases taxes.

"The bonded debt of the City of Los Angeles is now \$103,364,337.50."

Is It Throwing Good Money After Bad?

Note how these bond issues came along: first a small one of three and a half millions, then six and a half millions; then thirteen and a half millions, then thirty-five millions; and that failing, one of thirty now reduced to twenty-one millions. As in most public ownership schemes, it has been a case of first getting the people in part way, getting their toe in the door and then pulling them wholly through. I doubt if there are a thousand voters in Los Angeles who would have voted for the first issue if they could have foreseen what was to come after. They went into the power business in the belief and on the promise that three and a half million was the beginning and the end of their invest-

ment and necessary only to enable the city to use the aqueduct and its waters to the best advantage. Now they are in for twenty-three millions and may get in for twenty-one more, forty-four millions in all.

And here let me say that the purchase, generation and sale of power and light has become a big business in Los Angeles. Hundreds of men and women are employed at it. The department which handles it is one of the largest in the city government. It is called the Bureau of Power and Light. It has managers, engineers, superintendents, agents and attorneys. Many of them are enthusiasts, followers of fads and experiments, who like to speak of themselves as men and women dedicated to public service. Opposition to them or to their dreams or experiments is taken as opposition to the people. It is a defiance, if you please, of the **people's** will.

But when they go out to talk about the Bureau and its experiences they tread softly. There are many things they do not tell.

The Bureau and the Aqueduct

They do not tell you that the Power Bureau pays nothing for water stored in costly reservoirs and delivered through two hundred miles of aqueduct to its power plants forty miles from Los Angeles.

They do not tell you that the Bureau takes this water almost within sight of the city, as if it were taking a mountain stream that nature had put there. To the Bureau it is as if God had put a water-fall forty miles from Los Angeles.

Yet that water had to be collected and stored in the mountains and brought two hundred miles through ditch and tunnel to the Power Bureau's diversion works. Often it happens that more than one-half the water is used wholly for power. Much of it, turned out for power purposes, is never brought back into the aqueduct and never reaches Los Angeles. It is not even sold for irrigation but is allowed to flow on to the ocean.

The aqueduct cost roughly twenty-four and a half million dollars. Under ordinary business management the Power Bureau should pay half the cost of operation and half the annual depreciation to the point where the water is diverted for power. Likewise it should pay half the interest on the investment and half the bonds as they fall due.

Would anything less be asked of a private company? The question answers itself. If the Edison Company, for example, had built a power house where the Power Bureau did, it would have had to pay for the water what it cost to bring it there. No one would assume in dealing with a private company that the water at the point of diversion was nature's product to be harnessed without charge.

How to Make the Water Department Pay

Figures have been published in Los Angeles which show that the Power Bureau should pay from a million to a million and a half dollars a year for its share of the aqueduct. The figures for the fiscal year ending June 30, 1923, have been given as \$300,000 for operation and depreciation and \$1,000,000 for interest and principal on the bonds, a total of \$1,300,000.

I believe it is generally admitted that the water project by itself does not pay. It does not take in money enough or charge rates high enough to pay its full interest and sinking fund charges. In the fiscal year ending June 30, 1923, it fell short \$1,100,000 in taking care of the interest and sinking fund due on its bonds. This was necessarily taken out of taxes.

At the same time the Power Bureau escaped paying \$1,300,000 for its share of the aqueduct. Had it paid this sum the Water Department would not have been required to take \$1,100,000 out of taxes. Rather it would have been left with a clear credit of \$200,000.

Meeting Bond Interest and Principal

Our friends of the Power Bureau do not tell you that for many years they did not set aside anything out of earnings to retire bonds as they fell due. Yet the law of the state directs that municipal bonds be paid off at a given proportion per year. At the end of the fiscal year there were outstanding and unpaid \$21,300,000, on which a proper yearly allowance for retirement would have been \$532,500. These figures have been published several times in Los Angeles, recently by the Business Property Owners' and Managers' Association.

They do not advertise the fact that the Power Bureau pays no taxes. Private companies pay to our state 7½ per cent of their gross revenue. They pay in national and local taxes an additional 2½ per cent, 10 per cent in all. According to its own figures the Power Bureau made gross earnings for the year ending June 30, 1923, of \$7,762,606, 10 per cent of which is the tidy sum of \$776,260. This amount the Bureau did not pay out. The state and nation did not wipe that amount off. They did not go without that money; they did not cut expenses to meet this loss. They necessarily took it out of the rest of the people.

A One Per Cent Profit

Ignoring these items, the Power Bureau claims a profit of \$2,693,623 for the fiscal year. If it was charged these items (viz: \$1,100,000 for use of the aqueduct, \$532,500 to pay off its bonds as they fell due and \$776,260 for taxes), there would be a balance of only \$284,863. This is, as the Los Angeles Times has said, less than one per cent on the investment which the Bureau by its own books fixes at \$35,340,448.

Neither do they tell you that for years the Power Bureau made no serious effort to pay interest on its bonds at all, or to pay such of its bonds as fell due. They left that to the glowing future,—and the taxpayers.

In the years from 1910-11 to June 30, 1923, the taxpayers paid for this account about \$6,500,000, which is today a debt owing the taxpayers. It should be said for the Power Bureau, however, that it made no charge against taxes for the fiscal year ending June 30, 1923, and has so far made no such charge for this fiscal year.

This statement as to the six and a half millions paid out of taxes is not a random statement. The

audit of Price, Waterhouse & Company shows it. The Power Bureau admits it, but prefers not to talk about it. Really, they ignore it, and in its place claim a surplus of \$6,423,203 at the end of the last fiscal year which they say is invested in the enterprise—that it is in earnings put back into the business. That amount may have gone back into the business. But with about \$6,500,000 still owing to the taxpayers, it is not a surplus,—not yet. It went into a distinct business activity of the city, which under the rules of normal business should pay its way. To pay bond interest and due bonds out of taxes is equivalent to asking the stockholders of a private company to go down into their pockets to pay interest on a mortgage and then pay the mortgage itself. What corporation would call any money on hand or invested in the business a surplus, until the money raised by assessments had been paid back? At the present time, then, if the Power Bureau should reimburse the taxpayers, there would be no surplus.

High Lights and Side Lights

The foregoing are some of the high lights: the ever-mounting, multiplying bond issues; free use of the aqueduct leaving the Water Department to run behind; failure to set aside moneys each year to pay bonds as they fall due; failure to show reduction in rates to cover the unpaid taxes; and the large sum still owing to the taxpayers, for money taken out of taxes to pay interest and to retire bonds.

There are many side lights equally as interesting.

Formerly the Edison company furnished light free for the city hall, for police and fire stations and other city buildings. Since taking over the Edison system, the Power Bureau has charged the city for this service and has been paid out of taxes. My best information is that this will amount to \$100,000 a year.

A Word About Rates

While the Power Bureau made a small reduction of rates in 1917, it increased its rates in 1920 by 12½ per cent. This increase absorbed the old reductions and made a rate higher than the private companies charged before municipal power came to Los Angeles. Meanwhile the Railroad Commission has reduced the rates of the privately owned companies at least twice and today the Edison company claims that in some sections outside Los Angeles its rates are actually less than the rates of the Power Bureau. And the Edison company pays ten per cent of its receipts in taxes.

Since it bought out the Edison company, the Power Bureau has never had sufficient power to supply the City of Los Angeles and has therefore been compelled to purchase from the Edison company. Last year its former competitor furnished the Bureau more than half its power, and at times, 75 to 80 per cent. This cost the Power Bureau in 1923, \$1,400,000. When these purchases began, in 1917, the Edison's rate as a wholesaler was one-third higher than it is today. But the Bureau has never passed the reduction on to the rate payers. The figures show that in 1923 the Power Bureau paid the

Edison company \$600,000 less than if the 1917 rates still prevailed. A recent further cut will reduce the cost by more than \$700,000 for 1924.

The Ratio of Employees to Customers

It may be that these savings on power have gone to new employees, for there seems to have been a great increase in numbers in the Power Bureau. When the Edison system was taken over, there was one employee to every 244 consumers. Today under the Power Bureau there is one to every 95 consumers. That is, under the private company one employee was enough for 244 consumers, while under the Power Bureau one employee is required for every 95 consumers. This is an increase of 275 per cent. Consumers have increased in the same period only 45 per cent.

Last August the Power Bureau borrowed from the city treasury \$500,000 to pay for necessary repairs and extensions, without which they could not go on giving service to new customers. The request was for two millions, but there was only \$500,000 available, and the Bureau had to be content with that. This money is being paid back in monthly installments of \$50,000, without interest. At the time this loan was made, it was openly stated in Los Angeles that the Power Bureau owed \$3,000,000 for materials and supplies bought within the last year or two. This statement has been repeatedly made, and has not been denied, although the amount has been stated as less than three million. The bond issue which was defeated last May was expected to supply funds to liquidate this indebtedness. When it failed, arrangements were made to carry many of the creditors indefinitely by paying them interest at 6 per cent.

Los Angeles' Industrial Growth

The Power Bureau makes a very plausible claim that the great industrial growth of Los Angeles is due to low power rates. But it seems that the greatest increase in the use of power for industrial purposes has been not in the city, but in the territory outside. The great users of power have their plants in places like Vernon and Torrance, just outside the city limits, where power is supplied by private companies. The best available figures show that the power load in the Los Angeles metropolitan area increased 223,000 horsepower during 1923, of which 39 per cent was inside the city limits and 61 per cent outside. Of the increased load inside the city limits, the Power Bureau secured less than one-half, and its proportion of the increase in the metropolitan area was only 18 per cent. That is, the use of power increased on the private systems more than five times as fast as on the municipal system. This confirms the claims of the private companies that rates are lower outside of Los Angeles than within.

It is claimed by the Power Bureau that its rates are lower than prevail in San Francisco. But in Los Angeles, opponents of the Power Bureau say that while the lighting rates are higher in San Francisco, the average power rate is lower by about 8 per cent. R. H. Ballard, general manager of the Edison company, testified before Congress recently, in an inves-

tigation of the Colorado River project, that the Los Angeles rates in effect in San Francisco would mean a reduction there of about \$500,000 a year. He said that in Los Angeles no taxes are paid, and that in San Francisco the light and power corporations pay 10 per cent of their earnings in taxes. In other quarters I am told the San Francisco companies pay on their electric business in that city over \$1,000,000 a year in taxes. This means that if tax exempt they could undersell the Los Angeles Power Bureau about \$500,000 a year.

Relationship Between Rates and Votes

In fixing rates, the Railroad Commission proceeds upon the theory that cities depend upon agriculture and industry. If agriculture and industry flourish, towns and cities spring up, with homes, stores, offices and shops to be lighted. On the other hand, if farms and factories do not thrive there are no towns or cities requiring light. Therefore under regulation, rates rather favor industry and agriculture. Public ownership seems to go upon the opposite theory, and fix and favor lighting rates first. Of course the light consumers constitute the greatest number; many more voters use light than power, hence the policy of favoring the light consumer in rates seems to be good politics. But even if popular, such a policy is not sound. It would never build a city from the beginning. It works only where municipal management is resorted to after a city is built up.

Public ownership naturally seeks monopoly. The Power Bureau is now trying to buy out the Los Angeles Gas & Electric Corporation, thus removing its last competitor. The claim is made that the Power Bureau cannot achieve complete success until it gets this property. There is talk of savings by consolidation, of efficiencies, great and small. However, the Los Angeles Gas & Electric Corporation seems to be thriving on the same rates charged by the Power Bureau, and is stubbornly resisting all efforts to purchase. In 1923 its power load grew 11 per cent to the Power Bureau's 20. Its lighting load grew 33 per cent to the Bureau's 15. It declares it can make good returns to its stockholders in competition with the Power Bureau, although its income is taxed, its bonds are taxed, and the Power Bureau is tax free.

Competition or Monopoly?

There are those in Los Angeles who believe that the separate existence of the Gas & Electric corporation is wholesome, for with it removed by absorption, the Power Bureau would become an unregulated monopoly. As long as it remains, the Power Bureau must meet a measure of competition, which is somewhat regulative. Nobody outside of itself has a word to say as to rates or management. It fixes its own rates and establishes its own standards. Without competition it could raise rates; almost certainly it would be indifferent about service. It is generally admitted in Los Angeles that the best service is where the Bureau is in direct competition with the Los Angeles company. Competition is always reciprocally stimulating. The poorest service is found

where the Bureau has a monopoly, for it is monopoly entirely unregulated.

The Los Angeles general tax rate, both city and county, is \$3.96; San Francisco's is \$3.47. There are in Los Angeles a great many improvement districts, all of which levy assessments for municipal purposes, often for things done in San Francisco out of the general levy or from bonds. One of the districts, Municipal Improvement District No. 9, has an assessment rate of \$3, which added to the general tax rate makes a total of \$6.96 in that district. The average in these special districts is five cents on the hundred, so it may be said that the average tax rate in Los Angeles is \$4.01 per \$100 of valuation.

For the last fiscal year Los Angeles increased its assessed valuation by 27 per cent. Before that, its average yearly increase was only 8 per cent. I am told that San Francisco has increased its assessed valuation only 5 per cent for the year 1923-1924, and that its average over a long period does not exceed that.

Jeopardizing the Schools

Los Angeles' extraordinary growth is bewildering. A proposal is now before the people to vote \$34,000,000 in September for schools. The Tax Reduction Alliance makes this statement:

"We have today 655 half-day schools, and there are hundreds of students who are unable to attend because of the crowded conditions. The enrollment for February of this year shows the astonishing increase of 33,500 over February of last year. To provide school rooms for this increase alone would require more than a fifteen-room school building every week."

The president of this organization, Frank O. Bristol, formerly a member of the Board of Education, says:

"If Los Angeles wants to commit suicide the best way that I know of is to let it be known in the East that we do not care properly for our school children. But we will not do this. We will provide for them and we will not let the petty plans of the professional politicians of the Power Bureau cause us to neglect the schools and the children.

"As between the dubious proposition of municipal ownership of public utilities and the urgent necessity of more schools, I am for more schools."

On this platform Mr. Bristol and the Tax Reduction Alliance are opposing the bond issue of twenty-one millions for power, which is coming up on May 6. That is, they are urging the people not to vote for that issue if by so doing they will jeopardize the school bonds in September. The point made is that schools must have first consideration; that the children of the city must not be neglected for the ambitions of the Power Bureau.

Power and Growth

Burdette Moody, business agent of the Power Bureau, talked before the San Francisco Commonwealth Club a short time ago. He credited the Power Bureau with much if not all of the industrial growth of Los Angeles. But it must have occurred to those who heard him that the moving picture industry and the capital that followed it contributed to this growth; that the great oil discoveries at Signal Hill and Santa Fe Springs had something to do with it; that capital brought by men and women who have

retired from business in other parts of the country and moved to Los Angeles had something to do with it; that the great tourist traffic pouring into Los Angeles and the south had some effect; and finally, that the somewhat lower labor costs, due to great numbers coming without fixed employment, and being willing to take what offered, had something to do with the city's industrial development as well as its phenomenal growth in population. The city has grown wonderfully these last few years. It has perhaps a million people, but the two million Mr. Moody speaks of are yet to arrive. It has had a great industrial growth, but the Power Bureau has not done it all alone. Other factors and other forces have helped.

If Mr. Moody had communicated with the Oakland and the San Francisco Chambers of Commerce, he might not have made some of the claims he did. I learn from these bodies that:

San Francisco added 250 new industries and mercantile enterprises during the week ending March 4, 1924. And last year, 1923, business enterprises to the number of 3,703 located within the limits of that city.

Census figures show that the manufacturing output of Oakland has increased 315 per cent since 1914 as compared with 146 per cent in Los Angeles.

According to the Oakland Chamber of Commerce, 46 nationally known industries have located in Oakland. These industries have built plants for supplying the entire West Coast and Australia and the Orient as well. Only one or two have opened branches in Los Angeles.

The growth in San Francisco and in Oakland is certainly some answer to Mr. Moody's claims. The Los Angeles Power Bureau does not operate in either city and yet both grow, perhaps in great and substantial industries faster than Los Angeles.

Some Things Los Angeles Needs

Los Angeles owns its own water and its own power. But as yet it has no city hall worthy of the name; no great auditorium; no civic center except prospectively; no fine or distinguished public buildings. The public library is still housed over the village drug store, although a library building is now under way.

San Francisco has all these, city hall, auditorium, public library, civic center. They give the city distinction and advertise a wisely directed public spirit.

Difference Between Private and Public Ownership

The experience of Los Angeles demonstrates that the essential difference between municipal and private ownership is not one of physical plant or operating organization which supply service, nor in the standards of service, nor in the rate schedules, but in the character, the policy, and the purpose of the management. Municipal ownership began there as elsewhere with a group of men who desired to engage in the power business, but, having none of the equipment or the capital necessary, they proposed to undertake it provided the city would furnish all the funds, assume all the risks, exempt them

from all taxes, and give them the preferred status and immunities of municipal employers. They invested no money, took no chances, and no matter how many pledges are broken, how many promises unfulfilled, no responsibility attaches to them for the result. The people pay the bill.

Privately-owned utilities, on the other hand, must regard the service they render as a business, subject to all the laws, regulations, and ethical standards of the business world, asking for it neither special privilege nor immunity from taxation. They, in good faith, invest their capital and assume the risks and the hazards incident to such enterprises. They become as much a part of the community as any of its other enterprises or activities.

Must the People Suffer and Pay?

There is, then, just this great difference: one is responsible and can be held to the performance of its duty; the other cannot. One must keep its engagements, fulfill its promises, or lose money, while the other has no money to lose, no investment to safeguard, and can therefore, promise anything under the dome of heaven, trusting that the people may forget, and if they don't, that they will have to pay anyhow.

Politics has been defined as the passionate pursuit of the second best. In government, state or municipal, national too for that matter, politics is ever present; it follows the government into business if the government goes into business. And where the nation or a state or city goes into business, it gets politics; it enters into the passionate pursuit of the second best.

Hydroelectric Plant Being Erected in New South Wales

THE first step in the development of hydroelectric energy in the Clarence River Valley, northern New South Wales, is being taken under the direction of Messrs. Armstrong Whitworth & Company, Ltd., of London. The Nymbodia hydroelectric scheme is the first of such dimensions in northern New South Wales. The site of the power house is near the township of Nymbodia, about 26 miles from Grafton, where the stream attains its greatest volume. The estimate of the cost of the work is £100,000.

Current will be generated at the power house at 6,000 volts and will be stepped up to 33,000 volts for transmission to South Grafton and Ulmarra. A 1,200-kw. transmission line is being constructed to those centers and at both places substations will be erected from which electricity will be distributed throughout the towns and adjoining districts.

With 1,600 hp. at the power house, the peak loads at the distribution centers will be 1,420 hp. and it is estimated that 3,090,000 kw-hr. can be sold annually with a load factor of 33 per cent. The new plant will enable factories to be built along the Clarence River and is a part of the movement to counteract the tendency of centralizing industrial undertakings in the large cities and bring the factory nearer the source of raw material.

Reintroducing the Proposed California \$500,000,000 Socialistic Venture

PETITIONS are in circulation to place on the ballot by initiative at the election to be held November 4, 1924, the same proposed constitutional amendment, called the Water and Power Act, which was rejected by the voters at the election in November, 1922, by a majority of 353,849. The vote against the Act two years ago was nearly two and a half to one.

Notwithstanding the faults of the Act exposed by criticism during the former campaign, the promoters of the measure have not altered it by so much as a syllable. Apparently their position is that the Act, born of omniscience, was, is and always will be, perfect.

While readers of the Journal of Electricity were made familiar with the Act in the previous campaign, the measure, if enacted, would affect the electrical industry so radically that it is well to re-state the principal features of the proposed legislation.

It creates a board of five members to be appointed by the governor. The chairman shall be the executive officer, devoting all his time to the duties of the office and receiving a salary of \$15,000 per year. The other members shall receive a per diem of \$20. The legislature may increase their compensation. Provision is made for overlapping terms of four years each. The legislature may by a two-thirds vote of all its members remove members of the board from office for dereliction of duty, corruption or incompetency, and the legislature shall provide by law for removal of members by recall. The majority of the board shall constitute a quorum.

The board shall have power to acquire by any legal means, including condemnation, land, water or any property or rights "necessary or convenient for the purposes of this article" (i. e., of the Act), and also to acquire, construct and operate works, even including railroads, to do anything and all things "necessary or convenient for the conservation, development, storage and distribution of water, and the generation, transmission and distribution of electric energy."

The board shall have power also "to purchase, acquire, produce, manufacture or otherwise provide facilities, materials and supplies, raw or finished, and any property or thing necessary or convenient to the accomplishment of the purposes of this

IN 1921 there was introduced in California an initiative measure known as the Water and Power Act. It was overwhelmingly defeated in 1922 by a vote of nearly two and a half to one. Despite this, the ardent proponents of the bill again are offering it to the voters of the state for their approval or rejection. While the measure is the same in every respect as the 1922 model, we offer this discussion of its provisions to refresh the memory of the electrical industry.

article." In other words, the board can go into any branch of the electrical business or virtually any other business.

Powers granted to the board, among many other things, are to require the reservation of water from appropriation for such periods as it may provide, to supply water or electric energy or both to the State, political subdivisions and other users, and, subject to the provisions of the Act, to prescribe the terms of

contracts, and fix the price thereon and collect the same. That is to say, the board is not subject to regulation by the Railroad Commission and may fix its own rates for the water or electric energy it sells.

Income to Pay Investment Cost

The Act says that the rates established shall be such as in the board's judgment will provide, in addition to the expenses of operation, maintenance, depreciation, insurance and reserve for losses, funds to pay the principal and interest of all bonds issued as the same fall due, together with all sums which may be advanced from the general fund and interest thereon as provided in the Act. Rates shall include a charge which, in the judgment of the board, will pay within fifty years the cost of the particular project; except that where the rates are intended to provide for the repayment of expenditures made in acquiring or constructing distributing systems for political subdivisions, they shall be so fixed as in the judgment of the board will effect a repayment with interest within twenty-five years. These directions to the board concerning what is to be included in rates are qualified by the interesting provision that "the board may change rates when in its opinion advisable to meet changed conditions and shall always keep its rates as near the amount required to pay such cost and expenses as practicable and shall fix similar rates under substantially similar conditions." Competition with a privately owned public utility would probably constitute a "changed condition" which would authorize the board to sell below cost and fall back on the taxpayers for the deficit.

The board may also acquire or construct for political subdivisions distributing systems for water or electric energy "bought from the State" upon terms that "in the opinion of the board" will repay to the State within twenty-five years the cost thereof with interest.

The board may appoint, define the duties and fix the compensation of such employees as it may require subject to such civil service regulations "as the board may provide." That is to say, the board is granted unlimited power to hire and fire and is not subject to the state civil service regulations.

Board Has Unlimited Powers

In case the framers of the Act have overlooked anything they have provided that the board shall have power "to exercise all powers needful for the accomplishment of the purposes of this article and such additional powers as may be granted by the legislature." The purposes of the Act are broadly stated "to conserve, develop and control the waters of the State for the use and benefit of the people."

In addition to the board a "finance committee" is established composed of the Governor, Controller, Treasurer, Chairman of the Board of Control and Chairman of the Water and Power Board, all of whom shall serve without compensation. This probably would be a perfunctory committee. It has no supervision over the board but shall issue and sell bonds upon written requisition of the board containing certain specified information about the purpose or projects for which the money is required. The committee must issue the bonds on receipt of the proper requisition from the board but may determine the form, rate of interest, maturities, denominations and other terms of the bonds.

\$500,000,000 in Bonds

The Act authorizes the issuance of bonds of the State of California "not exceeding" the sum of \$500,000,000 to be issued and sold from time to time to carry out the purposes of the Act, and the "full faith and credit of the State of California" is pledged for the payment of the principal of the bonds as they mature and the interest accruing thereon as it falls due. The interest rate on the bonds shall not exceed six per cent per annum.

Bonds shall be sold only for the acquisition of such property and rights and the construction, development, operation and maintenance of such projects as the board may deem necessary or convenient for the accomplishment of the purposes of the Act; but the committee, upon requisition of the board, shall sell bonds not exceeding in the aggregate five million dollars, the proceeds of which shall be placed in a revolving fund to be used by the board for the purpose of defraying its expenses, acquiring property and supplies, carrying charges during construction and "meeting other costs incurred in carrying out the purposes of the Act." It is obvious that this highly flexible five-million-dollar revolving fund can be used for many purposes.

If at any time the revenue from projects shall be insufficient to pay the interest or principal of outstanding bonds as it falls due, the committee, with the consent of the Governor, may sell bonds to provide funds to make such payments of interest or principal. The payment of old obligations of interest as well as principal by new bond issues is authorized, according to the Act, "in order to avoid appropria-

tions from the general fund and resulting taxation," but careful provision is also made for meeting deficits by taxation.

It is contemplated by the Act that the revolving fund shall be replenished by each project to the extent of the advance made to that project from the proceeds of bonds sold to provide funds for the cost of such project.

Revenues of the board "except proceeds from the sale of bonds" shall be paid into the state treasury and applied first, to overhead, costs of operation and losses; and second, to the payment of interest on principal of bonds; but if at any time the fund in the state treasury applicable to the payment of interest or principal of said bonds shall be insufficient for that purpose, moneys shall be "temporarily" advanced from the general fund for that purpose, and the Act provides "there is hereby appropriated from the general fund in the state treasury such sum annually as will be necessary to pay such interest and principal, and there shall be collected each year in the same manner and at the same time as other state revenue is collected such sum in addition to the other revenues of the State as shall be required to pay the sums appropriated for payment of interest and principal as herein provided."

Taxes Guarantee Bond Interest

By this singular provision, if projects fail to earn revenue sufficient to meet the obligations of the bonds with respect to interest and principal, the deficit shall be made up out of taxes and these taxes shall be collected like other state revenues from the public utility companies and other corporations from which state taxes are now collected. By this ingenious device the privately operated public utilities and the other corporations which pay state taxes, are automatically required to guarantee the principal and interest of the bonds issued by the Water and Power Board. Taxes collected for that purpose from private corporations will, of course, be passed on to their customers. The framers of the Act do not trust the state legislature to meet the deficits of the board by appropriating funds at successive sessions of the legislature but propose to write into the constitution a continuing appropriation automatically effective whenever the board shall be unable out of its revenues to meet its bond obligations.

All moneys paid from the general fund in the state treasury for principal or interest of such bonds are supposed to be returned to the general fund out of the revenues of the board "as soon as the same become available"; but, of course, if the board does not earn the money it can never pay it back. In brief, the effect of these provisions is that the board is to meet expenses and pay off the capital investment and interest thereon out of earnings, if possible, but any deficits are to be made up out of taxes and these taxes are to be collected from the corporations which now pay taxes directly to the state and those corporations will, of course, pass on to the public the losses suffered by the Water and Power Board. Resort to the taxpayer may be delayed, how-

ever, by issuing bonds to pay interest and costs of operation and maintenance.

State and political subdivisions shall have a preferred right to water and electric energy controlled by the board "as against privately owned public utilities selling water or electric energy to the public." Railroads are, therefore, virtually placed on a parity with the state and political subdivisions, since they do not sell water or electric energy to the public.

There is also this curious and not entirely clear provision which has never been adequately explained: "As between those otherwise equally entitled, the board shall supply water or electric energy to political subdivisions near the source of supply, to the extent of their reasonable needs, in preference to those more remote."

Act Is Discriminatory

The Act prohibits the board from supplying water to a privately owned public utility for the production of electric energy and from supplying directly or indirectly to privately owned public utilities "which sell electric energy or water to the public" (again excepting railroads by the qualification) more than twenty per cent of the total amount of electric energy or water under its control, and from extending contracts therefor over a longer period than five years, and prohibits that any such contract be renewed prior to one year before its expiration. Under this provision the board could sell any quantity of electric energy or water to a railroad.

Any political subdivision or group of political subdivisions contemplating the development of water or electric energy must submit its plans to the board for "suggestions and criticism," and the board may acquire and develop any such project unless the political subdivision claiming the same shall have adopted plans and estimates for the development, and authorized bonds to cover the cost thereof, or shall do so within two years after the board shall have notified such political subdivision of its readiness to proceed with such development.

Can Condemn Private Property

In any condemnation proceeding under the Act, the determination of the board that the taking of the property described is necessary shall be conclusive evidence of such necessity, and in any such proceeding the State may take immediate possession and use of any property required for the purposes of the Act by paying into the court such amount of money as the court "upon five days' notice to the adverse party" may determine as reasonably adequate to secure to the owner of the property immediate payment of just compensation for such taking and any damages incident thereto.

Property appropriated to public use may be condemned for the purposes of the act but not property owned or controlled by any political subdivision used or proposed to be used for supplying water or electric energy, or both, without the consent of the political subdivision.

Every public office, board, commission or agency must supply the board with all data and information in its possession required by the board. The act is self-executing.

Objections Are Numerous

The objections to the proposed act are fundamental and numerous. An unregulated, appointed board is empowered to pledge the credit of the State to the extent of half a billion dollars by issuing tax-free bonds and to speculate with the money in unspecified water or power ventures or any incidental business, which would include, for example, **dealing in electrical supplies**, as is now being done in California by certain irrigation districts. The board could favor one section as against another while using the credit of all. The board could build up its own political machine and fix its own rates for the water and power served.

So elastic is the act that preferential rates could easily be granted to favored communities, industries, or individuals. No regulation of service or rates is contemplated. If successful, the projects are supposed to pay their own way and take care of the capital investment in time. If unsuccessful, the general fund of the state, contributed by taxpayers, must make up deficits.

Nor could politicians make rates contrary to economic conditions. The cost of generating power is the same for state or private company. Low rates in the face of unfavorable conditions would only result in passing the burden on to the taxpayers in the form of increased taxes.

Some of the Consequences

Politically and economically the act is bad. Bureau government in its worst form exercising arbitrary control over industry, political management of business enterprises, the power to levy taxes placed in the hands of officials very remotely responsive to the public, speculation in hazardous enterprises with the taxpayers' money without the taxpayers' consent, the erection of a powerful political machine, and the breaking down of the electrical industry as it has been established in California by private enterprise—these would be some of the inescapable consequences of the Act.

Nor is there any reason to expect that the Act would result in better service or lower rates or any benefit to the public.

Our present system gives us the efficiency of private management with full protection to the public through regulation.

Sound regulation backed by intelligent public understanding and combined with community of interest created by public ownership of securities is far more desirable than a business in which politics takes the place of private enterprise.

Common sense revolts against the idea of undoing all that has been accomplished by private ownership under regulation and delivering the great basic electrical industry into the hands of unregulated politicians.

The Need for Electrical Inspection in Rural Districts

By Claude W. Mitchell

Electrical Engineer, Board of Fire Underwriters of the Pacific

IT has been said that in some parts of California vegetation is so rank and of such rapid growth that if one wishes to pick a pumpkin it is necessary to ride a horse and lasso the pumpkin because the vines grow so fast. Not being very adept in the use of the lariat I have never endeavored to harvest pumpkins by this method, but I have seen the rapidly growing "vines" in the form of transmission and distribution lines which are reaching out into the most distant of the populated rural districts. Ahead of these lines and particularly into the sparsely settled parts of the country have gone the farm lighting plants. Thus, in one way or another, the wonderful boon of electricity is being brought to the inhabitants of the districts far removed from the cities.

Unfortunately, in a large number if not a majority, of the electrical installations outside certain city limits, the good spirit of electricity, come to aid and bless mankind, is accompanied by an evil spectre in the form of hazard to life by injury or death and to property through damage or destruction by fire. Fortunately, that condition does not exist in all installations.

Where the installation is well made in conformity with certain standard regulations, with workmanship of a good quality, where material, devices and equipment also comply with certain minimum standard specifications and where the installation and utilization equipment are used properly, there is no question but that electricity provides the safest means for furnishing light, heat and power.

After an original installation is completed it devolves upon the user as to whether or not the equipment and installation shall have proper treatment and use. Prior to that time the responsibility rests, usually, with the installer. User and installer may be the same person.

Not infrequently the owner or occupant, somewhat of a "Jack-of-all-trades," purchases materials and makes the installation himself. He is not proficient in the methods of wiring. He is unversed in, if not entirely ignorant of any rules or regulations that may have been accepted generally as necessary to be complied with in order to obtain safety. He is unfamiliar with the materials and devices and is likely to be guided in his choice by cost rather than quality and if his purchases should chance to be made from an unscrupulous dealer he may obtain articles which have been tabooed for use by inspection departments and, if used at all, must be "unloaded" on such as he. He is without sufficient knowledge of the potential hazards of a poor installation to cause him

to investigate these points or to hesitate to make the installation in the easiest and cheapest way possible. And, lastly, he is without the jurisdiction of any regulatory or administrative body which might compel him to comply with certain standards.

Considering, then, these qualifications of the worker and his materials (mayhap, his tools as well) and the lack of restrictions upon him, it is not to be wondered at if the result of his labors is an installation fraught with potential hazards. It requires but the coincidence of conditions or, possibly, lapse of time to cause these hazards to change from the potential state to that of actuality. The resultant damage to life or property cannot be foretold.

Causes of Sub-Standard Installations

It is regrettable that such a condition exists, but not so deplorable when brought into existence in the manner just outlined as when a condition almost, if not equally, as hazardous is created by those who should and do have the knowledge of which the owner-installer may be ignorant. For it is true, that many sub-standard installations are made by men who have the knowledge and ability necessary to enable them to do the work in an approved manner. Unscrupulous contractors and workmen are responsible for some of this defective work and some of it is done by those who would prefer to do it properly but cannot if they are to compete successfully with poor workmanship and sub-standard materials at correspondingly lower prices.

When the owner or builder asks for bids he is very apt to accept the lowest. Undoubtedly it is his honest belief that it is more economical to install the cheaper materials, believing it will serve his purposes as efficiently as the more expensive. He does not realize that the difference in cost may represent the difference between hazard and safety. This should not be taken to imply that the more expensive the installation the better it will be, but it is true that there is a certain minimum cost for an installation below which the materials are of questionable quality and workmanship is of an inferior grade.

These conditions, which have been outlined in the preceding paragraphs, are to be found occasionally in the larger cities. But, in general, they exist in the districts which properly may be called rural, in the suburban districts or those lying just outside of or close to city limits and in the smaller cities and towns where no electrical inspection service is maintained. This fact gives a clue to a possible solution of the problem.

The larger, as well as some of the smaller, cities and towns maintain departments for the regulation and inspection of electrical installations and equipment. The general class of work to be found in any one of these places depends upon the efficiency of its inspection department. That efficiency involves not only the personnel of the department but the standards and rules which serve as a guide for the inspectors.

The most generally accepted standards are the National Electrical Code and the National Electrical Safety Code. Where these have been adopted together with such other regulations as are necessary to meet local conditions and the department makes an honest endeavor to abide by their requirements without partiality, conditions are most favorable. Contractors and workmen know what is expected of them and what they may expect and the one who pays for the installation obtains one with a maximum of safety and efficiency.

When such results can be obtained in municipalities through the operation of the inspection department it is reasonable to suppose that a similar condition might be obtained in the suburban and rural districts by the creation of similar inspection service. Such rural inspection is not impossible and to the question "Within whose jurisdiction does it lie?" the most logical answer seems to place the burden upon either the state or county authorities. Municipal inspectors have no authority outside city limits. Public service corporation inspectors have no authority or interest beyond that part of the equipment owned or installed by the corporation. It would seem, then, that to provide adequate inspection departments for suburban and rural districts a movement must be started with the object of convincing state or county authorities of the necessity for this inspection and securing action which will create such departments and provide the necessary laws for their efficient operation.

Electric Heating in the Esparto Union High School

By A. Strauch

Electric Heating Engineer, San Francisco, Calif.

ELECTRIC heating of schools has proved itself in California. The results experienced have been satisfactory, the cost of operation has been low and the convenience and desirability have been notable. Numerous schools are now electrically heated and the number so equipped is increasing rapidly. Those schools located in rural or semi-remote districts find this means of heating particularly advantageous as it offers a solution for the janitor problem and eliminates fire hazard.

A typical example of rural school heated electrically is the Esparto Union High School at Esparto, Calif. This building erected by Gould & Johns, contractors, Stockton, Calif., was designed and supervised by W. H. Weeks, architect, 369 Pine Street, San Francisco. The building is constructed of reinforced concrete with light buff brick exterior and a heavy red tile roof; the rooms are large, light and airy; there is a small basement of two rooms, and most of the building is one-story in height, although the domestic science department is located on the second floor. There is a large auditorium with a 24-ft. ceiling and this room, like the rest of the building, is heated with electric heaters of the flush-type inserted in the walls. This installation was engineered by and made under the supervision of the writer.

In the class rooms and the auditorium, where it is necessary for persons to sit near the heaters, they are baffled in order to entirely eliminate radiant heat. This makes it possible to sit directly in front of the heaters without discomfort. All of the heat

being conducted into the air of the room, the result is that the room temperature varies but a few degrees and practically uniform temperature is maintained. In the offices and corridors standard Wesix flush type heaters are used.

The area to be heated consists of 207,803 cu. ft. and the equipment comprises 44 heaters with a total capacity of 188½ kw. A list of the rooms showing the size, volume, loss, outside wall surface and capacity of heaters installed is given below as are also the consumption, maximum demand and bills for energy during the months it has been operating. This installation is operating on the Pacific Gas and Electric system on their regular power schedule, "P-1 maximum demand," in which the rate is as follows:

50 to 99 hp. of maximum demand			
The first	50 kw-hr. per hp.	2.6c.	per kw-hr.
The next	50 " " "	1.7c.	" "
The next	150 " " "	1.1c.	" "
Balance		.8c.	" "
100 to 249 hp. per maximum demand			
The first	50 kw-hr. per hp.	2.3c.	per kw-hr.
The next	50 " " "	1.5c.	" "
The next	150 " " "	1.0c.	" "
Balance		.7c.	" "

The maximum demand in any month will be the average horsepower input as indicated by meters provided by the company. The minimum charge is \$1 per hp. of maximum demand for the first 50 hp. and 65c. per hp. for all demand in excess of 50 hp. but in no case less than \$50. Where the primary use is seasonal, the minimum charge may be made

cumulative over a 12-months' period. In this case the rate has averaged 2.38c. per kw-hr.

The heaters were figured to have capacity sufficient to maintain a temperature difference of 35 deg. F. between the outside and the inside of the building, with two changes of air per hour. The following table gives the sizes of the various rooms, together with the heater capacities installed for each room.

First Floor	Size Ft.	Glass Sq. Ft.	Outside Wall Sq. Ft.	Floor Sq. Ft.	Volume Cu. Ft.	Kw.
Right Lobby	{ 12x22x12½ 10x10x12½	60		364	4,550	3.3
Office	12x19x12½	36	114	228	2,910	2.5
Principal	16x22x12½	112	438	352	4,400	6.0
Chemistry Laboratory	22x32x12½	184	216	704	8,800	8.4
Physics Laboratory	22x32x12½	184	216	704	8,800	8.4
Class Room	22x26x12½	128	197	572	7,150	7.5
“ “	22x26x12½	128	470	572	7,150	8.4
Left Lobby	12x24x12½	60		288	3,600	3.3
First Aid Room.....	10x12x12½	30	95	120	1,500	2.0
Women Teachers	11x18x12½	30	108	198	2,475	2.5
Freehand Drawing	22x30x12½	208	442	660	8,250	10.0
Typing Room	18x22x12½	128	97	396	4,950	5.0
Bookkeeping Room	22x30x12½	208	455	682	8,525	10.0
Library	15x22x12½	96	367	330	4,125	5.0
Study Hall	22x34x12½	200	225	748	9,350	10.0
Class Room	18x22x12½	128	97	396	4,950	5.0
“ “	22x26x12½	144	456	572	7,150	8.4
Corridor	8x276x12½			2,208	23,185	13.3
Total,		2,064	3,993	10,094	121,820	119.0
Sewing Room	22x32x10½	156	410	704	7,392	8.4
Girls' Retiring Room.....	10x10x10½	26	100	100	1,050	1.6
Cooking Room	22x32x10½	156	410	704	7,392	8.4
Dining Room	12x12½x10½	26	100	150	1,575	2.5
Corridor	11x100x10½	1		1,100	11,550	6.6
Total,		364	1,020	2,758	28,959	27.5
Auditorium	{ 36x56x24					
Stage	{ 12x36x20	348	1,536	2,448	57,024	42.0
Class Rooms		2,308	5,013	8,892	107,794	120.0
Lobby and Corridors.....		120		3,960	42,985	26.5
Auditorium		348	1,536	2,448	57,024	42.0
Total,		2,776	6,549	15,300	207,803	188.5

The table below shows the kilowatt-hour consumption, horsepower of demand and the monthly bill for heating in this school. The average bill of \$79.78 per month for the winter months is commendably low in view of the volume of the building—207,803 cu. ft.

Year	Month	Kw-hr.	Max. Demand	Bills
1923	Nov.	1,040	59 hp.	\$ 55.85
“	Dec.	2,240	118 “	94.20
1924	Jan.	6,160	128.7 “	101.16
“	Feb.	5,440	80.4 “	97.76
“	Mar.	1,920	64.3 “	49.92

Average bill for five winter months, \$79.78 per month.

The installation has proved highly satisfactory in every respect and the principal, H. A. Sawyer, is enthusiastic over the service it has given. The power company considers this one of its finest heating installations and as marking the opening of a new era in school heating by electricity.

The Pacific Gas and Electric Company is so pleased with the results obtained that on March 15, with the consent and cooperation of the principal and the Esparto school board, they held a demonstration and inspection of the building and heating system to which all interested persons were invited. There were addresses on “The Development and Use of

Electricity,” “The Heating of Schools by Electricity,” “The Reading of the Electric Meter,” and “The Interpretation of Power and Lighting Bills.” Several reels of moving pictures were shown, a dinner was served by the girls of the school, and a dance was held in the evening at which the Pacific Gas and Electric Company orchestra furnished the music. The entertainment was planned and carried out through the

efforts of H. A. Sawyer; R. T. Stevens, superintendent of new business department, Pacific Gas and Electric Company, Sacramento; C. E. Sedgwick, manager of the Solano district, Pacific Gas and Electric Company; C. E. Wyatt, local manager of the Winters office, Pacific Gas and Electric Company. Guests were present from cities more than 100 miles distant. It was the consensus of opinion that this installation has proved beyond question that electricity when used with the proper type of heating equipment is the most modern and satisfactory agent for school heating in certain localities. Some of its outstanding advantages are, first, initial cost of installation generally half that of a steam heating system (in this case considerably less than half); second, flexibility, it being possible, due to the three-heat control of the heaters, to heat any room separately at any time to any desired temperature; third, safety and lowered fire risk; fourth, absence of attention and maintenance, no attention whatever being required from the janitor as each teacher controls the heat in her room as required; fifth, cleanliness and healthfulness, there being no effect on the air whatever.

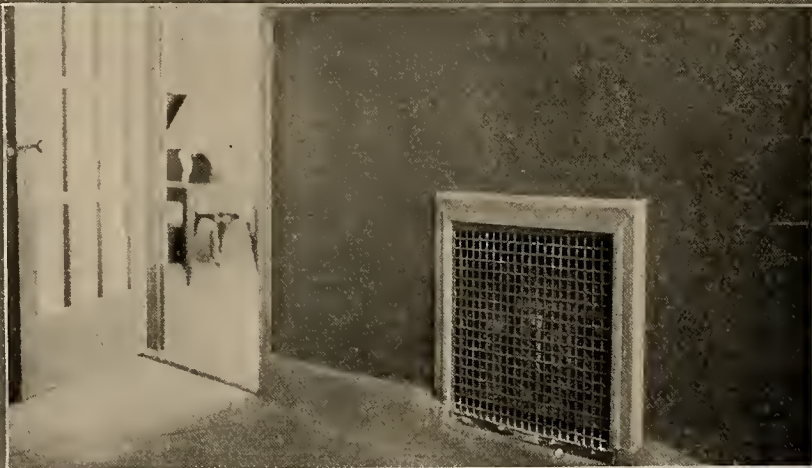
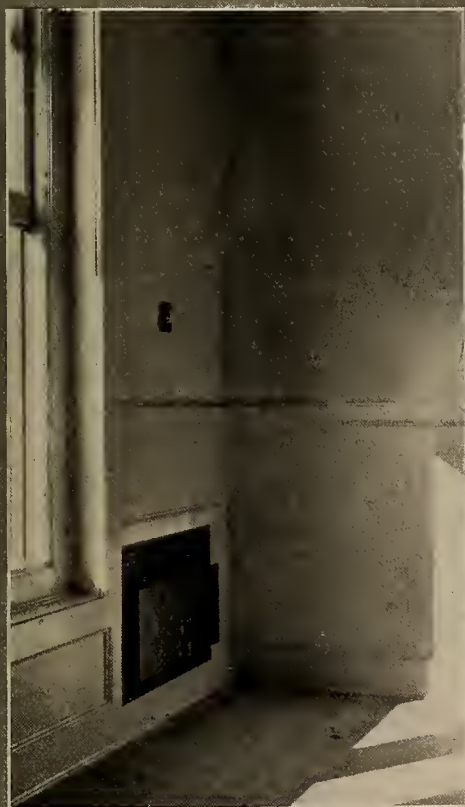
The domestic science department of this school is now equipped with a 5-kw. Wësix automatic water

heater and all of the cooking tables are arranged for electric stoves. It is the intention, shortly, to replace the present cooking equipment with electric ranges.

The wiring has been installed and is so arranged that each pupil will be able to use a range, although, of course, there is no thought of buying a range for

characteristics of each type. Other electrical kitchen equipment is already installed and the purchase of the electric ranges will bring about complete electrification of the domestic science department.

The cost of operation of the heaters has been less than was estimated and has been well within



An idea of the method of electrically heating the Esparto Union High School can be gained from the above illustrations. At top left is shown a view of the school itself. The other pictures show the types of Wesix heaters used.

each cooking table. It is the intention to purchase the most up-to-date equipment in order that students may be made thoroughly familiar with recent advances in cooking equipment. It is quite possible that both automatic and non-automatic ranges will be purchased in order to demonstrate the working

the most sanguine expectations. The installation has proved its practicability and has shown many advantages that will be capitalized by architects and school boards in other localities. It has, too, served to show students the possibilities of electric application and its adaptation to the home.

One of the simplest forms has been arranged by the H. E. Barrow Company, and when used in combination with a special sheet in their "Pacific Coast Electrical Data and Sales Book," makes for sim-

Fig. 2.

It is, of course, impossible to list all materials in a printed form as a reminder list. This applies particularly to special signal systems such as are installed in large private office buildings, hospitals, etc., but as these classes of jobs are in the minority they cannot be given consideration in a form which is to be used for the majority of jobs.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

ONE of the most essential points towards the successful operation of an accounting system is a thorough understanding of the general ledger accounts as set forth in the chart of accounts. It is from the accumulation of entries made in these accounts that we are enabled to obtain the necessary information for the preparation of the Statement of Condition and Profit and Loss Statement at the end of each closing period. As the sole desire is to paint a true picture of the results of operation in these statements, it can readily be seen how important their correct usage becomes, and with this idea in mind I am presenting the following analysis of these accounts:

No. 1—General Ledger Account—Bank Account.—The debit balance of this account represents the cash in bank at end of each month and should agree with the amount as shown in the “bank balance” columns of the cash book-journal. This account should be debited with the total of the “deposits” column and credited with the total of the “checks drawn” column of the cash book-journal monthly. This debit balance should be reconciled with the bank statement monthly by adding the total of the outstanding checks and deducting the total of the last day’s cash receipts not deposited until the first day of the following month.

No. 2—Petty Cash Fund.—The debit balance of this account represents the amount of permanent working fund established for petty cash disbursements and for change in cash register. This account should be debited with the amount of the original check drawn and cashed to establish this fund, from the sundries column of the cash book-journal as explained in the first article of this series.

No. 3—Accounts Receivable.—The debit balance of this controlling account represents the total amount due by customers at the end of each month, and should agree with the total of the balances of the individual accounts in the accounts receivable ledger. This account should be debited and credited monthly with the totals of the accounts receivable Dr. and Cr. columns, respectively, of the cash book-journal.

3-A—Provision for Doubtful Accounts.—The credit balance of this account represents the reserve set up out of profits against which to charge losses on worthless accounts when they occur. This ac-

count should be credited and account No. 63 debited with one per cent of net charge sales for period closed. All customers’ accounts considered uncollectible should be debited to this account and credited to accounts receivable at the end of each closing period.

No. 4—Notes Receivable.—The debit balance of this account represents the balance due on notes held by the business. It should be debited with the amount of notes when taken and credited with all payments received on such notes from the sundries Dr. and Cr. columns of the cash book-journal, respectively.

No. 10—Merchandise.—The debit balance of this account at the beginning of each period represents the value of physical inventory of merchandise on hand, which should include material on jobs in process unbilled, and should be debited monthly with the total of the merchandise Dr. column of the cash book-journal. At the end of each closing period when a physical inventory is taken, this account should be credited and account No. 52, Cost of Goods Sold, debited with the difference between the total debit balance of this account and the amount of the physical inventory to reduce the account to the physical inventory value for the beginning of the new period, in accordance with Fig. 1.

No. 11—Labor in Process.—The debit balance of this account at the beginning of each period represents the amount of labor paid on jobs in process

ACCT NO 10 Merchandise									
DATE	ITEMS	FOL	DEBITS	DATE	ITEMS	FOL	CREDITS		
1923				1923					
Jan. 1	Inventory		198765	Dec. 31	Cost of Goods Sold	12	1208260		
31	Purchases	1	85350	31	Balance		184275		
Feb. 28	"	2	97245						
Mar. 31	"	3	106450						
Apr. 30	"	4	98735						
May 31	"	5	75120						
June 30	"	6	112675						
July 31	"	7	94310						
Aug. 31	"	8	82415						
Sept. 30	"	9	96170						
Oct. 31	"	10	105225						
Nov. 30	"	11	119590						
Dec. 31	"	12	121455						
			1387535				1387535		
1924									
Jan. 1	Inventory		184275						

Fig. 1.

No. 30—Accounts Payable.—The credit balance of this controlling account represents the total amount due creditors on open account at the end of each month, and should agree with the total of the balances of the individual accounts in the accounts payable ledger. This account should be debited and credited monthly with the totals of the accounts

Fig. 2.

No. 41—Personal Account—This account should be debited monthly with the total of the personal account Dr. column of the cash book-journal and should be credited with a monthly salary allowance from the sundries Cr. column. The balance of this account, if any, at the end of each closing period should be transferred to capital account No. 40.

National Code Questions Are Answered by Engineer

The Journal of Electricity has made arrangements with Claude W. Mitchell, electrical engineer of the Board of Fire Underwriters of the Pacific, to answer questions on the 1923 edition of the National Electrical Code. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of inquiry.

Question. In reference to the matter of identified conductors. Is it necessary, in complying with the 1923 Code, to have the terminals of wiring devices and appliances identified?

Answer. The Electrical Committee, National Fire Protection, over the signature of Dana Pierce, chairman, has issued the following statement which answers this question fully:

"The Electrical Committee of the National Fire Protection Association (Code Committee) has been advised that there is some misunderstanding regarding the subject of identification of terminals of wiring devices under the 1923 edition of the National Electrical Code published as the Regulations of the National Board of Fire Underwriters for Electric Wiring and Apparatus as recommended by the National Fire Protection Association.

"The subject of identification of terminals was considered by the Electrical Committee in the preparation of this 1923 edition, but no rules or requirements were adopted and it was not and is not now the intention of the committee that any rules in this edition should require such identification or be interpreted to do so.

"The matter is still in the hands of a special technical sub-committee which is expected to report later with recommendations for a future edition of the Code when it shall have considered all phases of the matter among which are the form of markings, which devices do and which do not require such identification, the necessary time required to permit compliance with new rules, if adopted, etc.

"While some manufacturers of wiring devices have already begun the production of some devices with identified terminals the practice has not yet become general either with all makers or on complete lines of devices.

"There are still large quantities of devices without identified terminals in the stocks of manufacturers, jobbers, and others for the disposition of which reasonable time should be allowed.

"For these reasons the Electrical Committee judged it inadvisable to include requirements of identified terminals in the 1923 edition. The subject is receiving further careful consideration by the committee and by the manufacturer in anticipation of possible action at a future date."

The Underwriters' Laboratories has also issued a statement on this matter, which statement is as follows:

"It may also be noted that in accordance with the foregoing, Underwriters' Laboratories is not requiring the identification of terminals of wiring devices examined and tested by it for inclusion in the List of Inspected Electrical Appliances."



Two San Francisco apartment houses that have just been equipped with electric ranges. Both of these buildings are in high-class residential districts and it is claimed that the electrically equipped kitchens assist in their easy rental.

Electric Ranges Becoming Popular For Apartment Houses

It is constantly becoming known that electricity continues to serve humanity faithfully and well and that its application for domestic purposes is increasing daily. It is only in recent years that there has been extensive use of domestic electrical equipment but this form of application is growing in popularity. The comfort and convenience of electric ranges, for example, have become so well known to the progressive home and apartment house owner that these ranges are now in demand. It remains, generally, only to select the type desired for the particular premises.

One of the most recent extensive installations of electric ranges is that in the Rosenstein Apartments, San Francisco, Calif. This apartment is located in one of the best residential sections of the city and was for some years equipped with gas ranges. However, Mr. Rosenstein realized that he must keep his apartments up to date and decided to take out the gas ranges and to equip each apartment with a modern electric range. With the assistance of Harry W. Lippert, California representative for the Estate Stove Company, a special model range was procured and twenty of these ranges were purchased to replace the former equipment. Owing to the character of the district in which the apartment house is located and to the fact that all apartments bring a high rental, it was necessary to install ranges that combined efficiency with beauty and a model was selected that was finished in enamel and nickel plate. An interesting phase of this installation is the fact that the purchase and installation of these ranges involved the ex-

penditure of about \$3,000, whereas the purchase of gas stoves for these apartments would have cost only about \$600.

Another interesting installation, also in a San Francisco apartment building, has just been made in the Electra Apartments. The owner of this building, who selected the same model range as in the above apartment, was so impressed by the electric range that he not only bought them for his property but also named his house after the goddess of electricity. Dealers everywhere are finding electric ranges readily salable and an attractive line to push, not only as merchandise, but also because of the wiring jobs that always follow such sales.

Sacramento Electrical Society Holds Monthly Meeting

The regular monthly meeting of the Sacramento Valley Electrical Society was held Wednesday, April 9, at the Hotel Land, Sacramento, Calif., at 6:30 p.m. Harold Willis of the San Francisco-Sacramento Railroad presided. Fred Links led in group singing, and S. E. Gamble of the Westinghouse Electric & Manufacturing Company announced that five new members had been secured. It was stated that over 1,200 members had been enrolled in the Courteous Service Club.

The Great Western Power Company of California had charge of the program, J. W. Anderson acting as chairman. F. H. Woodward, general sales manager of the company, San Francisco, gave a short talk, and several interesting stories were told by various members. A moving picture showed how the longest high-voltage submarine cable in the world was laid, this being

an 11,000-volt cable with a capacity of 15,500 hp. extending from Richmond, Calif., to San Francisco. It was manufactured by the American Steel & Wire Company and laid under their supervision.

Unusual Sales Letter Employed To Sell Electric Ranges

As a means of reaching prospective electric range customers and of arousing their interest in the service that electric ranges give, the Great Western Power Company, Sacramento, Calif., decided to use sales letters of unusual type. The company offered a prize for the best letter submitted by a member of its force and the number of entries exceeded all expectations. From the letters submitted, that printed herewith was decided upon as being the most novel in its presentation of the electric range story and the prize was awarded to the author, C. H. Payne.

Dear Sir:—

ARE YOU A TRAVELING SALESMAN FROM BIRMINGHAM—like Mr. Johnson? with headquarters at home—sometimes?

The morning after the night before; home from a three weeks' trip out among the tanks; frost on the pumpkins and apartment-house roofs; clanging of street cars and honk of auto horns; Little Ben registers eight a.m.

"How come?" says Mr. Johnson, rousing friend wife from noisy slumber, "HOW COME?"

"What's the matter, George?" mutters fellow life-prisoner, swallowing pillow-case.

"How come no breakfast?" exhausts Head of Family. "It's eight P.G., you've died and gone to—er—Heaven and I'm due in office at ten. How Come?"

"Salright!" chatters better half, strangling on blanket, "breakfast's ready."

"Huh?" clashes H.O.F., "How Come?" "Electricity."

"What!" shifts H.O.F., strips gears and skids out of bed onto floor.

"A beautiful ELECTRIC RANGE, George," chatters Mrs. Geo., hastily donning a negligee and enfolding him

in a dressing gown. "A surprise for you and a treat for me. Come on," dragging him, stumbling, down the hall into the kitchen. "Sit down. Breakfast will be on the table in a jiffy."

"How co—?" murmurs H.O.F., opening muffler.

"Automatically," shifts Mrs. Geo., opening oven door. "Cooked while you sleep; heat regulated by the clock. See, George, golden brown," placing biscuits before him. "Aren't they beauties?"

"Hot Dog!" opens up Mr. Traveling Man From Birmingham—and reaches for the honey.

"See, George, here's the oven, here's the griddle and here are the attachments for iron, toaster and percolator. All clean; no dust, no dirt, no fumes, no smoke—just turn a switch."

"How much does she set us back?" sputters George thru honey.

"The prices are from \$57 to \$240. I took the most expensive."

"Sure," backfires George, "you always do."

"But you like it, don't you?"

"Uh huh," masticates George, "pass the honey and don't bother me."

YOU MAY NOT BE A TRAVELING MAN FROM BIRMINGHAM—OR LIKE HONEY—but we have an Electric Range that will interest you.

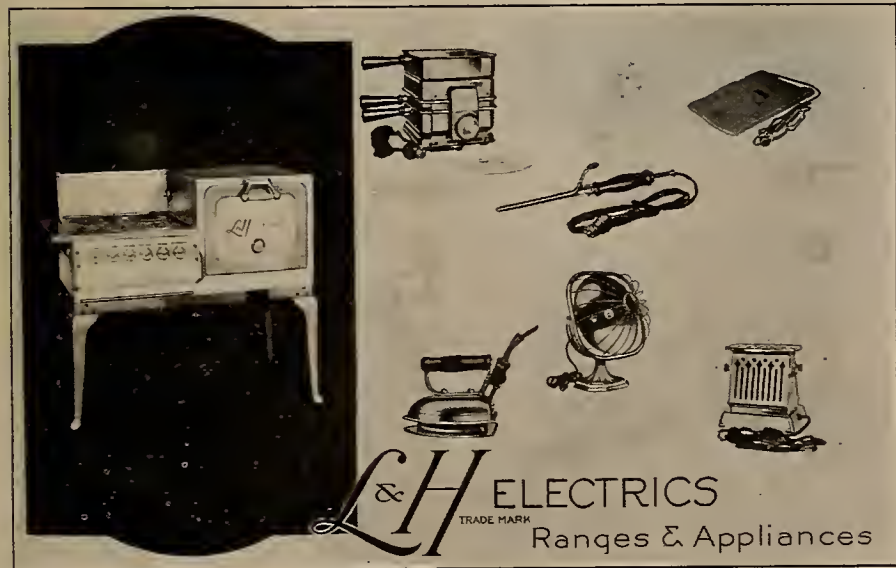
"JUST INVESTIGATE."

Yours Electrically,
GREAT WESTERN POWER CO.

Manufacturer's Advance Card Is Used to Sell Appliance Line

Dealers have become so accustomed to receive advance cards from salesmen from whom they buy, these cards advising of the date on which the salesman expects to be in town, that the cards are now looked for and are kept for reference until the salesman has left. This is particularly true of men who represent manufacturers and who, generally, do not cover a territory so often as do the sales forces of jobbers and those firms located within the dealer's home field.

The illustration herewith shows a novel form of advance card used by the A. J. Lindermann & Hoverson Company, Milwaukee, Wis. This card shows pictorially some of the major lines manufactured by the company.



Reproduction of the advance card used by the salesmen of the A. J. Lindermann & Hoverson Company to announce to merchants the date of expected arrival in the dealer's city.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

Taking as an example a store doing an electrical contracting and appliance business of \$100,000 per annum.

One department composed of washers, ironers and vacuum cleaners of, say, \$12,500 per annum, and where it was desirable to place the manager and sales force of this department on a commission basis, how would you apportion the overhead of this department and how would you arrive at a basis of fixing the amount of commission that could be paid salesmen consistent with reasonable margin of profit to the house?

Answer:

If there has been no departmental analysis of expenses made on the books, it is impossible to apportion overhead on an accurate basis. The apportionment of overhead expense over the several departments can only be accomplished by the proper arrangement of the books to include that essential feature.

The percentage of overhead in this department, excluding salaries of department manager and sales force, has averaged as high as 15 per cent of the sales in numerous instances. Using for example an average gross profit of 35 per cent, there would be a margin of 20 per cent of the amount of sales left to pay salesmen's and department manager's commissions. Commissions to them of 15 per cent would leave a net profit of only 5 per cent in accordance with the following illustration:

		Per Cent
Sales	\$12,500	100
Cost of merchandise	8,125	65
Gross profit	4,375	35
Overhead expense	1,875	15
	2,500	20
Commissions	1,875	15
Net profit	\$ 625	5

Association of Lighting Fixture Dealers Organized

The lighting fixture dealers of Sacramento, Calif., have recently formed a Fixture Dealers' Association in conjunction with the local Electrical Contractors' and Dealers' Association. The need of separate meetings of those interested in lighting fixtures has long been felt; the problems of this branch of the business are so different from contracting for electrical wiring only, and many of the members of the regular association are not only interested in selling fixtures, while some are exclusively fixture dealers. It is hoped that the purposes of both organizations will be better served under the new arrangement. L. M. McGinnis of the Scott Plumbing & Electrical Company has been elected president of the new association.

JOBBER, DEALER AND SALES AGENT



June Bride Week to Stimulate Sale of Appliances

Letters Sent Out Notifying California Dealers of Opportunities of Increasing Sales During Intensive Campaign

June Brides residing in California will have their homes completely equipped with the necessary electrical appliances, if the aim of the California Electrical Cooperative Campaign is achieved. Window displays, posters, cooperative advertisements, news stories in local papers and stuffers to be sent with all May electric bills are to be used to apprise the public of the fact that the June Bride should be given electrical appliances for her future comfort.

The aim of the cooperative organization is to arouse interest in electrical gifts so that dealers throughout the state may capitalize on the interest that will be worked up by the cooperative advertising schemes. Plans for the week June 2-7 are much the same as those followed in former years, the thought being that the public has become acquainted with the advertising used before and that prospective customers would recognize the material and thus understand its meaning more quickly than they would new types of advertisements.

To acquaint electrical dealers with the contemplated sales drive, the California Electrical Cooperative Campaign has recently sent out a letter describing the June Bride Week idea. The letter sent to the California dealers reads as follows:

Real money was made by those dealers who took advantage of June Bride Week last year. Were you one of those for whom it rang the cash register? If so you will be glad to hear that plans are now under way to repeat it; if you were not one of the wide-awake ones you lost money that you can't afford to lose again this year so you had better start planning right now to get on the band-wagon.

HERE IS THE IDEA! Whenever June—the month of weddings—comes around thousands of people ask themselves what they can give as wedding gifts to their newlywed friends, and they usually end up by buying pictures, silverware, china, or something like that, WHICH YOU DON'T SELL. They have never been made to appreciate the many qualities which would make any one of a number of electrical appliances the most acceptable gift which they could purchase, and YOU COULD SELL THEM.

WE'LL HELP YOU teach them that the proper gift is an electrical gift. We'll prepare attractive window display material for your use, we'll give you cuts for newspaper advertising which will tie this advertising in with your windows, we'll work with the newspapers carrying your advertising and get them to print some good interesting stories about electrical appliances as wedding gifts so the readers will pay more attention to your ads and your windows. All this we'll give you AT NO COST.

BUT we can't drag customers into your store, take their money from their pockets and put it in your cash register. You should make good use of the material we give you by fixing your windows up attractively; you should advertise your wares in the local newspapers in competi-

tion with the merchants who will be advertising art goods and house-furnishings as wedding gifts, and you should practice SALESMANSHIP upon every customer who comes in your store. We'll tell them—You sell them. And it means dollars and cents in your pocket if you get behind the drive and boost the idea of "Give Something Electrical."

And we are going to offer prizes, too. Eleven cash prizes aggregating \$100 offered for the best trimmed dealers' windows. Judgment will be reached by consideration of photographs submitted by the dealers of their windows. And to every dealer sending in a photograph which is not listed among the prize winners we will pay \$1.50 to reimburse him for the expense of having it taken. Start planning now to have one of the prize winning windows.

Please fill out and mail the enclosed postcard RIGHT NOW to let us know if you will do any newspaper advertising during the week of June

This sales drive will be from June 2 to 7. The material which we are offering to the dealers consists of the following:

A three-color poster similar to that of last year (the purpose in duplicating the poster previously used being an effort to establish this as a symbol of June Bride Week); and a set of five two-color sales-stimulating slogans. A 2-in. by 3-in. line cut for newspaper advertising for the power companies and for those dealers who will carry newspaper advertising. This cut will be a miniature black and white reproduction of the window poster in order to tie-in the newspaper advertising and the window displays.

The posters and slogans will be sent to all dealers whom we have on our lists but the newspaper cuts will have to be ordered from us on a return post card which we will enclose in a letter to the dealers. We ask them, in ordering these cuts, to specify the paper in which they will be used so that we may write to the papers, informing them from whom they will receive advertising during this period. On the strength of this advertising we will then be able to request the newspapers to publish certain publicity stories which we will furnish them and which will greatly enhance the value of the dealers' ads.



FOR WEDDING GIFTS

WHICH HAVE *BEAUTY* OF APPEARANCE. LEND *EASE* AND *COMFORT*, AND ARE *LASTING REMEMBRANCES* OF YOUR GOOD WISHES. CALL AT YOUR LOCAL ELECTRICAL DEALER'S STORE

18 GIFT SUGGESTIONS ON THE REVERSE SIDE

(OVER)

The stuffer, shown above, will be sent out with all California electric bills during the month of May.

2-7 and in what papers, so we may order the cuts for you, and arrange with the papers for the publicity articles. Wishing you a most successful season, we are

Yours very truly,

CALIFORNIA ELECTRICAL COOPERATIVE CAMPAIGN.

The aid of all jobbers' salesmen, calling on dealers in the state, has also been solicited in order that the dealers may be notified of the benefits of the week from as many sources as possible. That the salesmen may have a comprehensive idea of the plans for June Bride Week the executive secretary has sent the following letter to them.

The following is a summary of the plans for June Bride Week, 1924.

As regards the delivery of this material—in every town where there is a power company office we will send direct to that office enough material to take care of all their local dealers, writing the dealers that this material is awaiting them at their local power company office. This will permit of bulk shipments. In the case of towns where there is no power company office we will make individual shipments direct to the dealers. This material will all be in the hands of the dealers not later than the last week of May.

We are offering eleven cash prizes aggregating \$100 for the best trimmed June Bride Week windows which include the Campaign's material in the display. Judgment of the windows will be passed upon photographs sent in by the dealers. To all dealers sending in a picture not included among the prize winners the Campaign will pay \$1.50 to reimburse them for the expense of having the picture taken, thus they stand to lose absolutely nothing and there is a possibility of winning five, ten or twenty-five dollars.

I am attaching herewith copy of an insert which is being mailed by all of the power companies of California to their consumers when they send out their May bills. In other words, practically every user of electricity in the state will have his attention called to this "Week" just prior to the special window displays of the electrical dealers.

Kindly make it a point to keep June Bride Week before the attention of every electrical person with whom you talk from now on.

Yours very truly,

VICTOR W. HARTLEY.

That the consumers of electricity in the state may be notified of the fact

that electric appliances make suitable gifts for June Brides, stuffers have been supplied to all central stations. These stuffers are designed to be attached to each electric bill that is sent out during the month of May. The stuffers are printed in blue and carry an appropriate message on the front side stating that electrical gifts may be purchased at local electrical stores. On the reverse side there appears a list of eighteen suggestions.

By the same token, a business man at the head of an electrical concern, who fails to hobnob with his employees—

In the long run gets nothing but blah and plenty of that.

And, by blah, I mean do-less, shiftless, careless service—the kind of service which, if practiced for any length of time will—

Insure an early exit to any business. "A blah employee, children," said Petie Rabbit, "is a helpless human on any feed roll who is more interested in his check than his job; who dates time from last "Sattidy" night; who forgets to remember and who constantly keeps an eye glued to the Western Onion clock, fearing that it may stop or fail to register a dragging minute."

This class of employee is found, usually, in business houses where the Hi Yu Skookum checks in late and blows early; where the executive mind turns principally to increased volume, decreased operating costs and—

Recks not a jot nor a tittle of the Franks and Fannies who sweat and grunt under a heavy weight of woe.

And, to repay him for his indifference, the privates in this army loaf in barracks and put their fingers to their noses while his back is turned on parade.

He is the boss, surely, and he could put them in gaol for good for what they think of him and so—

The vicious circle is complete and—

Some fine day the lock of the law is snapped on the main entrance and the boss takes his place in the line of unemployed, wondering—

Why the thussness.

* * *

The picture I paint is dreary and uninspired, I own, but any business man can blot it out with a flirt of the hand—a cheery word and a smile from the heart—because—



Booth of the Southern Colorado Power Company at the Colorado State Fair. Note that every device on display will save labor in the home and will add to the ease of housework. This display formed a part of the general sales promotion plan of the company.

Colorado Company Conducts Appliance Sale Drive

Special Campaigns Put Large List of Electrical Appliances in Service in Southern Colorado Territory

The problem of the central stations of the West has not been the increase of load but, rather, the selection of the type of load increase. Natural and development conditions have brought an extensive industrial and commercial load increase and have also seen the usual domestic lighting load grow to proportions not conceived of years ago. This development, however, has had its disadvantages. The domestic load where it includes only lighting without the use of electric appliances, has been expensive of delivery and has in many cases proved very unprofitable. This has resulted in the promotion of the sale of electric appliances for domestic use and those central station companies which have not themselves maintained appliance sales departments have assisted in the promotion of the idea for the benefit of merchants.

Confronted with the problem of increasing selective load the Southern Colorado Power Company, under the direction of E. F. Stone, superintendent of the light, power and sales department, early in the spring of 1923 started a campaign for the popularizing of the use of domestic electric

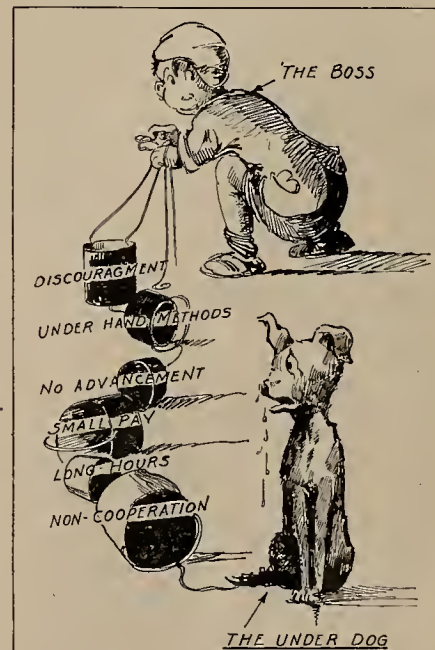
appliances. Extensive newspaper advertising was done and, in connection with the newspapers, electric cooking schools were held at various points. In addition to the advertising and cooperative work a direct sales plan was put into execution. Sales of more than 225 electric ranges are reported and, in addition, a campaign conducted during the month of September, produced the sale of over 125 electric percolators. A washing machine sales drive was also carried on and in the first five days of this special effort 46 machines were sold. Other effort was concentrated on combinations of electric iron, percolator and curling iron, etc., and notable success was achieved.

BLAH BOSSES BEGET BLAH EMPLOYEES

By JOE OSIER

The man who takes his wife nowhere, tells her nothing and treats her rough—

Usually winds up in a divorce court, where he wins his freedom and an alimony assessment which monthly puts a crimp in his cash on hand and—



Any employee, no matter how perverse or ill-tempered, will cherish a kind word or a friendly pat on the back even though he may realize they are given in lieu of a—

Hike in salary or a bonus check.

INDUSTRIAL NEWS



Groups Organize For and Against Colorado Springs Bonds

As expected, two definite camps have been established in Colorado Springs, Colo., on the municipal light plant issue which will be decided at a special election May 20. Both sides have launched their campaigns in the open with the opponents of municipal ownership having the support of the local newspapers. This situation, according to reports, has brought a Denver newspaper into the fight in support of the city council which has actively sponsored the proposition of the city going into the electric business, since a franchise was refused the privately owned company operating in that community.

Oliver H. Shoup, former governor of the state, is leading the opposition in the form of a voluntary committee of taxpayers which already numbers over 500. The campaign of this group is founded upon education in order that citizens may not be confused in the issues connected with the election. Newspaper advertising of that committee emphasizes that it does not represent the present central station and that the issue is not one where that company is concerned but rather one where the municipality may overburden itself unnecessarily with taxes and enter into an era of political dissipation.

On April 12, Ralph O. Giddings, a prominent merchant, was named chairman of the proponents' group and other officers, mostly business men of the city, were elected. This group is entrenched with the city council and according to newspaper dispatches, its membership exceeds the Shoup faction. Campaign offices have been opened by each side and the activity to date is said to indicate the bitterest fight yet experienced in Colorado Springs. Even money is now being offered on the outcome of the election.

Bone Power Bill Advocates Seek Signatures for Petition

Immediately following the filing of the Bone Power Bill in Washington a state-wide conference was called in Seattle, when plans for carrying on a militant campaign to secure the required 40,000 signatures to the petition for the bill were laid, and approximately \$1,000 raised to defray the first costs of the campaign. The meeting was called by A. Emerson Cross, city attorney of Aberdeen, and chairman of the Washington State Super-Power League, and was attended by approximately forty persons.

A committee of seven was appointed to take charge of the campaign. The committee will have state headquarters in Seattle. Present plans provide for

the sending throughout the state of a flying squadron of young lawyers, who will make speaking tours while obtaining signatures, and throughout the election campaign.

The Bone bill represents the opposition to the Reed power bill referred to popular vote by action of the last legislature, which latter measure provides for a 5 per cent state tax on gross revenues of municipally-owned generating systems selling any portion of their current outside the municipality.

Seventy-five members of the Western Washington Progressive Farmers' League recently went on record, in Everett, opposing the Bone and Erickson "super-power" bills. It is rumored that the league will initiate a measure of its own at a state-wide power meet to be called in Prosser in June, when a "bill acceptable to the farmers" will be presented. A committee composed of William Bouck, president of the organization, William Fortson and Frank Tuntsin, will prepare the bill. The Erickson bill was attacked with the charge that it was linked with activity of private power interests of the state. The meeting revealed considerable dissension between supporters of the state power schemes and the farm element, and the action of the farmers presages a split in the ranks of the "super-power" advocates.

Construction of New Substation at Roseburg Completed

The California Oregon Power Company has completed the construction of the new substation in North Roseburg, Oregon, at a cost of approximately \$42,000. Control of the entire system of the Umpqua division is centered in the new substation. A 66,000-volt line runs from Dixonville and is stepped down through a bank of 1,000-kva. transformers. Another bank of transformers of the same capacity handles the output of the Winchester plant. These two feeder lines may be operated alone or together.

There are now four circuits supplying the city. In addition to these there are two street lighting circuits.

Boulder Canyon Site Favored.—A. P. Davis, former director of the government reclamation service, appearing recently before the House of Representatives Irrigation Committee, gave it as his opinion that the Boulder Canyon site was the one point on which all power and irrigation development of the Colorado River should hinge. He said work there could be carried forward at greater speed and less cost than anywhere else and that development at other locations would fit in.

Los Angeles Will Vote on Power Bonds May 6, 1924

A twenty-one million dollar bond issue for the Bureau of Power & Light of the City of Los Angeles, said to be for extensions and betterments and substations for the city distributing system over a period of three years, will be placed before the voters of the city on May 6, 1924. A \$35,000,000 bond proposal which included \$25,000,000 to start development on the Colorado River failed to receive the necessary two-thirds majority at the city election in June, 1923, and the power bureau is said to be badly in need of funds to finance extensions, betterments, substations, etc.

The opponents of the proposed issue contend that the work can be done for less than \$11,000,000 and they suspect that a part of the money is to be spent for a purpose not revealed. It is further argued that since the city is already heavily bonded that water bonds, school bonds and bonds for other vital requirements should be voted ahead of the power bonds.

Aberdeen Seeks Federal Permit for Wynooche River Site

The City of Aberdeen, Wash., has applied to the Federal Power Commission for a preliminary permit covering a project on the Wynooche River. This application is in direct conflict with the proposed development of the Sanderson and Porter utility known as the Grays Harbor Light & Power Company.

This action on the part of the City of Aberdeen is another step in its program which is being cited as a glaring example of ill-advised municipal activity. In this instance, without having obtained rights, without having had a survey or an engineering study to determine the feasibility of the water power project or its cost, the city has voted a bond issue of \$2,000,000 for its project.

The vote which authorized the bond issue provided a bare majority. It is reported that the support for the bond issue came largely from the non-property holders and the radical element.

Application for Arizona Power Sites Made.—Dell M. Potter has applied to the Federal Power Commission for a preliminary permit to construct a series of four power projects on Black River, in eastern Arizona, about 50 miles north of Clifton. Storage is not contemplated, but by using the run of the river only, through a total drop of 1,125 ft., Mr. Potter estimates that approximately 12,000 hp. will be developed.

Hoof and Mouth Disease Affects California Power Companies

Stringent quarantine regulations in combating the epidemic of foot and mouth disease which is sweeping California herds at the present time have caused considerable trouble and inconvenience to power companies in the affected regions. In the San Joaquin Valley and in certain districts in southern California the San Joaquin Light & Power Corporation and the Southern California Edison Company are extending every effort to aid state and national authorities in stamping out the disease.

The foot and mouth disease is extremely contagious. When it broke out in the herds at Merced, Calif., the San Joaquin Light & Power Corporation found itself barred from all farms, either for meter reading and inspection or for construction work. This same rigid protection from germ spreading was promptly put into force in every county of the valley. It was pointed out that any person moving from farm to farm might easily carry the germs and thereby spread the disease. Official edict kept all persons from going upon infected farms, while a voluntary quarantine which has generally been observed also kept them from going upon other farms.

However, the ordinary functioning of business had to continue. General Manager A. Emory Wishon of the San Joaquin company issued immediate instructions, after Dr. C. E. Mordoff of the medical department had conferred with the authorities, that all employees should observe quarantine rules, official or unofficial, conveying the gentle hint that anyone failing to observe this injunction would be thereby intimating that he did not like his job. Construction gangs were notified that they could go upon farm lands and into cattle fields only in emergencies. All trucks carried as part of their equipment rubber boots and overcoats and pans for disinfecting solutions. The employee entering the ranch property had to don boots and coat, sponge them thoroughly with the disinfectant, and sponge them once again upon his return to the truck. This rule has since been made less stringent, the authorities being satisfied if the men disinfect their shoes thoroughly. This does not, of course, apply to their entrance upon ranches in the infected territory, where every precaution is taken to prevent any germ carrying.

Meter readers, however, being compelled by the very nature of their business to go from place to place, are still compelled to wear the rubber coats and boots. They carry pans and sponges and in addition a spraying machine; so that their automobiles may be thoroughly disinfected. In some of the districts it has been necessary to stop all meter reading, and billing will be done on the average rate, with the understanding that corrections shall be made when the quarantine is lifted. This method will not, however, be resorted to to any great extent, as without in any way attempting to minimize the serious nature of the epidemic, the fact is that only a few herds have been infected. These herds are in territory in most cases a considerable distance away from the towns and cities and from the territory where the bulk of agricultural products is grown. Some of the in-

fectured herds have been big in numbers. Only a few head have shown actual infection, but it is the policy to slaughter and bury the entire herd in order that there may be complete eradication. The drastic measures resorted to have inevitably created some hysteria not at all justified by facts. The authorities are satisfied that they have the situation well in hand and that with co-operation in all directions they will not be long in checking any new outbreaks.

Nevertheless, there has been bred a feeling of apprehension which has made itself felt in all lines of business. The power companies have been affected, as they are always affected by any adverse business condition. However, it is pointed out that the normal functioning of business cannot long be interrupted, and in the past week there has been a gradual readjustment, with business activity on the upgrade.

Los Angeles, Calif., Light and Power Bond Issue Opposed

The efforts of the Municipal Bureau of Power and Light of Los Angeles, Calif., to obtain \$21,000,000 for extensions and betterments to the municipal power system are meeting with decided opposition.

The bond election will be held May 6. The recently organized Citizens' Bond Committee, formed to try "to prevent unwarranted and unnecessary expenditure which will increase taxes and the cost of living," takes the stand that the power and light bonds do not cover an essential need and that such essential issues as bonds for schools, police and fire departments, making bridges and viaducts safe, and for an incinerating plant should come first.

The committee points out that the present bonded indebtedness of the city is \$103,364,837.50, while the issues proposed amount to more than \$102,000,000. The Citizens' Committee of Ten Thousand, after an investigation of the city's water and power requirements made by a sub-committee, has adopted through its board of directors a resolution to oppose the \$21,000,000 power bond issue and to urge the voters to reject it on the grounds that the amount asked is excessive.

Construction on Diamond Creek Project Stopped.—James B. Girand has withdrawn his construction force from his project at Diamond Creek on the Colorado River, in compliance with the terms of a temporary federal injunction. On the initiation of the Department of Justice, Mr. Girand has been asked to suspend work until the court can consider the advisability of making the injunction permanent.

New Bill Makes Klamath River Project Dependent upon Congress.—Representative Raker of California has introduced a bill into the House of Representatives prohibiting the granting of permits for the erection of dams, reservoirs or other works on the Klamath River for power development or transmission "without specific authority of Congress." According to reports, the bill is intended to prevent the Electro Metals Company from securing the necessary permission for its contemplated power project on the Klamath.

Licenses and Permits Rejected By Federal Commission

In order to clear its records, the Federal Power Commission has authorized the rejection of a number of applications for preliminary permits or licenses. These applications refer to projects which the applicants are not prepared to develop or for which the market will not justify development within a reasonable time. Before the action was taken, the applicants were advised that rejection was contemplated because of the lack of evidence of their ability to carry out their proposals within a reasonable time. In the following cases, the applicants raised no objection and the applications have been rejected: Southern California Edison Company, Salmon Creek reservoir and Horse Creek diversion; San Joaquin Light & Power Corporation, main stream of Kings River; City of Denver, South Platte River.

A preliminary permit issued to Joseph B. Leighton, of Miles City, Mont., covering a proposed project on the Yellowstone River, at Buffalo Rapids, has been cancelled because of the failure to carry out certain conditions of the permit. For similar reasons a preliminary permit granted to the Eureka Hydroelectric Company, of Eureka, Mont., covering a proposed project on Graves Creek, has been cancelled.

Order New Turbo-Generator for Astoria Power Plant

Due to the rapidly increasing call upon the Pacific Power & Light Company's power plant in Astoria, Ore., and in anticipation of continued increase as the new permanent buildings in the city are occupied, the company has ordered an additional generator unit for the Astoria plant. The order also calls for condenser and other auxiliaries.

The new generator will be of 5,000-kw. capacity, and is expected to be in operation about Nov. 1, 1924. The present capacity of the plant is 3,000 kw. The new equipment will cost over \$200,000 installed. During the past winter the company invested more than \$100,000 in improvements to its plant, changing its furnaces from fuel oil to hog fuel burners.

Utility Publishes Booklet to Instruct Consumers in Use of Service.—To give consumers suggestions in the use of both electricity and gas that it sells, the Pacific Gas and Electric Company has recently published a 24-page booklet entitled "Service Manual—A Guide to Pacific Service." The booklet contains information concerning the service offered by the company as well as suggestions as to how to secure the best results economically from the use of the service. Proper procedure to be followed in case electric service is interrupted is also given in the booklet.

B. C. Electric Railway Company to Build Line by Day Labor.—Bids received by the British Columbia Electric Railway Company for constructing a new three-phase, 34,600-volt double circuit transmission line about 13 miles along the west shore of Stave Lake were too high and have been rejected. The company will build the line by day labor.

Erection of Municipal Project Started by Loveland

Another chapter in the twelve-year struggle of the city of Loveland, Colo., against the Western Light & Power Company, later absorbed by the Public Service Company of Colorado, has been written. The city has decided to ignore the hearing completed April 10 before the Colorado State Public Utilities Commission and has begun active work on the construction of a hydroelectric plant at a contract price of \$371,685.14. The contract was let to the Hendrie & Bolthoff Manufacturing & Supply Company of Denver.

A number of years ago Loveland voted bonds in the sum of \$125,000 for the erection of the plant. Since that time material and labor have advanced to such an extent, so much money has been spent by the city in suits, and the demand for a larger plant has become so necessary on account of the city's growth that the city council has authorized the expenditure of \$425,000 for the installation of the plant, issuing bonds, in addition to those voted by the people, to the extent of \$300,000.

The latter bonds are known as "Loveland Municipal Light and Power Revenue Bonds" and are a direct tax on the people, but are to be paid out of the revenue derived from the plant covering a period of fifteen years.

The Hendrie & Bolthoff company, under contract, has agreed to take these bonds at par, in connection with the \$125,000 voted by the people, in payment for construction of the plant.

The decision of the Colorado Supreme Court April 7, in the case of the town of Holyoke vs. Smith, in which the court said in effect that the public utilities commission had no authority to interfere in any manner in the affairs of a charter governed municipality, is believed by the city council of Loveland and its supporters to have disqualified the commission from sitting in the Loveland case and the city is going ahead with the construction of the plant, regardless of the commission decision which has not yet been handed down.

At the hearing before the utilities commission, the Public Service Company of Colorado, now serving the city with light and power, introduced many expert witnesses, including engineers from the University of Colorado who testified the plant would cost in the neighborhood of \$600,000 and that the water flow in the Big Thompson Canyon was at times too low to handle the plant, also that a stand-by system would have to be built in addition to the plant, at a cost of \$90,000.

Construction Work on Pit No. 3 Progressing Rapidly

Construction work on the Pit River No. 3 project of the Pacific Gas and Electric Company is progressing rapidly, according to P. M. Downing, vice-president in charge of electrical construction and operation. The temporary diversion dam, to divert the waters of the Pit River from its natural course during construction work, has been completed and the water is now flowing through a concrete flume. This flume is 450 ft. long, 30 ft. wide on top, 20 ft. wide on the bottom and 12 ft. deep. At the present time construction crews are working on the dry river bed building

the foundation for the permanent dam. The permanent dam will be 110 ft. high.

The four-mile tunnel which will carry water from the damsite to the power house has been driven for a distance of about 5,000 ft. This tunnel will be 20,998 ft. long and 19 ft. in diameter and is to be concreted throughout.

Pit No. 3 Power House will have an installed capacity of 108,000 hp. The plant will operate under a head of 315 ft. Energy from this plant will be fed into the 220-kv. lines coming from Pit No. 1 plant at a point east of Redding and delivered at the Vaca-Dixon Substation 200 miles away.

Control Equipment Described at Denver Meeting.—Members of the Denver, Colo., electrical industry were afforded an opportunity, recently, to learn of the newest developments in motor control, automatic stopping and starting and other phases of industrial control in an illustrated talk by W. C. Yates, manager of industrial control sales of the General Electric Company, with headquarters at Schenectady, N. Y. The meeting was held under the auspices of the Electrical Cooperative League.

Erection of Elwha River Plant Sanctioned by State

Authority to begin construction work on a 20,000-hp. hydroelectric plant on the Elwha River in Clallam County, Wash., has been granted the Northwest Power & Manufacturing Company of Port Angeles by Marvin Chase, Washington state supervisor of hydraulics. The cost of constructing the plant is estimated at \$1,600,000.

The permit gives the company the right to appropriate 1,300 sec.-ft. of water from the stream. The development involves the construction of a reinforced concrete dam 15 ft. high, 180 ft. long on the top and 160 ft. long on the bottom, a main canal $3\frac{1}{2}$ miles long and a power house.

The energy developed is to be used for power and manufacturing purposes and for the government navy yard at Bremerton. It is estimated that 6,750 hp. will be needed immediately to supply patrons of the company and that the entire 20,000 hp. will be needed eventually. The company now has a plant in operation lower down on the river.



Artist's conception of Pit No. 3 Power House as it will appear when the plant is completed.



Floating power plant on the Columbia River which has recently been put in service by The Long-Bell Lumber Company, of Longview, Wash.

Lumber Company Puts Floating Power Plant in Service

A floating power plant with a capacity of 1,500 kw. has been put in service by the Long-Bell Lumber Company to supply electric service to Longview, Wash. The power plant is only a temporary one and was installed to supply service to the city until the permanent plant of the lumber company can be completed. Longview is located at the confluence of the Columbia and Cowlitz Rivers, about 50 miles from Portland, Ore., and the same distance from the ocean.

In designing the temporary power plant, engineers on the project found that there was a tide variation of about 5 ft. at the site on which it was desired to erect the plant. It was determined that it would be necessary to locate the plant about 35 ft. from low water level if it was to be placed on shore. This condition called for the expenditure of a large sum of money and also considerable time would be required for the erection of the plant. In view of these facts, it was decided to construct a floating power plant that should be moored on the Columbia River. Barges of suitable size were available and one of them with the plant on board could be moored close to the shore where connections with a fuel oil line and distribution line on shore were possible. Furthermore, the floating power plant could be secured and put in service in a short time.

Within twenty-eight days after the decision to build this type of plant was reached, the plant was in operation. It consists of a barge 134 ft. long with a beam of 34 ft. and suitable cabin for covering the equipment, one 1,500-kw. Allis-Chalmers turbine, 2,300-volt generator and jet condenser. The boiler equipment consists of two locomotive-type boilers of 250 hp. each and one Hawkes boiler of 250 hp. Oil is used for fuel, two pumps of suitable size and an oil heater being installed on the barge.

A fuel oil tank on the barge has a capacity of 180 bbl. and is connected to a large storage tank on the shore by a 6-in. pipe on the dock and by a 4-in.

hose from the dock to the barge. The barge has a 500-ton capacity and it was necessary to reinforce it between decks to properly support the deck load.

The turbine generator was originally 440-volt and had to be rewound. This work and that of assembling the plant was done in Portland. The barge was then towed down the Columbia River to Longview where it was moored. Care had to be taken in mooring the barge so that it would not be affected by the waves from passing steamers. In order to make sure of ample protection from rolling, the barge was fitted with heavy log outriggers on each side and a log boom was drawn around it to minimize the wave action.

Although several difficulties were encountered in obtaining a temporary power plant and doubt was expressed as to the practicability of a floating plant, it was constructed in a short time at a considerable saving over what a plant on the land would have cost and its operation has been successful.

Equipment for Muscle Shoals Project Is Ordered.—The War Department of the United States has just placed an order for four 32,500-kva. vertical water wheel generators each with direct connected exciter for the Wilson dam hydroelectric project at Muscle Shoals. This order, which includes switchboard and auxiliary equipment, was given to the General Electric Company. The four generators are each rated 32,500 kva., 26,000 kw., 100 r.p.m., 1,200 volts, three-phase, 60-cycle. The switchboard equipment will include control apparatus for eight generating units, four of which have previously been ordered by the government. Delivery is to be made in the summer of 1925.

Federal Power Commission's Regulations Printed.—The second revised issue of the Federal Power Commission's general regulations has been printed and is now available for distribution. Copies will be mailed upon application. This second revised issue embodies the text of all rules and regulations, as they have been amended, for administration of the Federal Water Power Act.

New York Company Seeks Permit for Sultan River Site

The Sound Power Company of New York, which has been interested for many years in a proposed development on the Sultan River near Everett, Wash., and which holds a preliminary permit covering the site, has filed an application for license with the Federal Power Commission. The company states that it is ready to proceed with construction. An upper project capable of developing 65,000 hp. and a lower project capable of developing 80,000 hp. are planned. The applicant expects to find an industrial market for most of its power. The power bill will be used chiefly in pulp and paper manufacture and in connection with forest product industries. The company expects to make the development so that the cost will not exceed \$90 per installed horsepower.

This project is of particular interest because it is one of the few which are not being put forward as an extension of an existing public utility. Like the Priest Rapids development on the Columbia, and that of the Columbia Valley Power Company on the Deschutes, the project involves the creation of an entirely new market.

Deschutes River Project Subject of License Application

An application for license has been filed with the Federal Power Commission by the Columbia Valley Power Company to cover its important proposed development on the Deschutes River in central Oregon. The company in its application states that it is ready to proceed with the construction of the works to be erected on the Pelton site. At that site, the company plans to construct dams 125 ft. high to develop 51,000 hp. The company states that a market for all of the power which will be developed at the Pelton dam has been insured.

On completing that part of the project, the company plans to proceed immediately with its work on the Metolius dam, which is the larger part of the project. At that site, the company proposes to build an arch dam 270 ft. high and to develop 120,000 hp.

The two sites combined afford unusually cheap power. The obstacle which has prevented this development heretofore has been the question of enough market to carry the investment during the first few years. The company believes that that problem now has been solved. The engineering work on the project is to be done by Parsons, Brinkerhoff, Clapp and Douglass.

Salt Lake City Engineers Hear Talk by Seattle Editor.—Kenneth C. Kerr, editor and manager of the Railroad and Marine News, of Seattle, Wash., was the principal speaker at the April 14 luncheon of the All-Engineers' Club of Salt Lake City, Utah. R. K. Brown, chief engineer of the Salt Lake & Utah Railway, and president of the Engineering Council of Utah, presided at the luncheon, which was attended by about forty engineers of the various organizations. C. R. Higson, assistant to the chief engineer of the Utah Power & Light Company, read an interesting sketch of some of the activities of Thomas A. Edison, giving a "close-up" of some of his characteristics.

Series of Advertisements Sent Out by Cooperative Body

To further stimulate utility advertising in the Rocky Mountain region and to more vividly portray the development of utility service to the people of the region, the Rocky Mountain Committee on Public Utility Information is preparing a series of illustrated advertisements to be supplied all member companies. The first series of advertisements is on the "Old West," and is the product of George E. Lewis, executive manager of the committee.

This advertising design service will be financed as a committee activity. Mats, stereotypes, and proofs will be furnished; the utilities to place the service with the newspapers in their communities. The first advertisement in the

series, entitled "The Prairie Schooner," was released for publication late in March.

New Half Million Dollar Westinghouse Plant to Be Erected in California.—The Westinghouse Electric & Manufacturing Company has awarded a contract to the Dinwiddie Construction Company of San Francisco for the construction of a second large building unit on the 12-acre plot of ground owned by the Westinghouse company in Emeryville, Calif. This new plant when completed will cost close to \$500,000 and will give employment to a large number of people. The new building will provide accommodations for a large assembling shop, extensive service and repair shops, and a zone warehouse.

Cooperative Radio Exposition Is Held by Denver Concerns

The first cooperative radio campaign and exposition to be organized in the Rocky Mountain states, was staged by Denver, Colo., radio interests April 7, 8 and 9. Owing to the success of the enterprise, it is now planned definitely to arrange another exposition in the Denver municipal auditorium in the fall. It is expected that the new \$175,000 broadcasting station which is being constructed in Denver by the General Electric Company will be in operation by that time.

No estimate is obtainable of the number of radio fans in Denver that saw the display, which was provided by twenty radio distributors, dealers and manufacturers' representatives. Special display booths were built to house the equipment and a special broadcasting station studio was provided also as a further means of stimulating interest in radio activities.

The exposition was free to the public. Admission was gained by the presentation of special complimentary tickets which had been printed to boost the radio show. Special attention of the reading public was secured by a twelve-page radio supplement appearing in the Denver Post on Sunday, April 6. Official endorsement of the enterprise was given by the Electrical Cooperative League of Denver.

Following are the Denver firms that participated in the exposition: Hendrie & Bolthoff Manufacturing & Supply Company, Reynolds Radio Company, Inc., Rocky Mountain Radio Corporation, Winner Radio Corporation, Echo-phone Radio Shop, Scott Brothers Electric Company, Bergman-Dilley Company, Premier Electric Company, Cahn-Forster Electric Company, French Battery & Carbon Company, Mile High Photo Company, Crosley Radio Company, Maedel's Hardware Company, A. & M. Radio Manufacturing Company, W. L. Winner Radio Shop, Denver Radio Service Company, Ball Radio Company, Knight-Campbell Music Company, National Carbon Company of Long Island, N. Y., Alden Napier Manufacturing Company, Chicago, Ill., and the Crosley Radio Company of Cincinnati, Ohio.

Record for Tunnel Construction Made by Florence Lake Crews.—Construction crews at Camp 63 working on the Florence Lake Tunnel of the Big Creek project of the Southern California Edison Company drove the 15-ft. tunnel a distance of 150 ft. through solid granite during the week ended April 5. The distance covered is on an average of 21.4 ft. per day and is the world's record for tunnel construction in solid granite with 15-ft. cross-section. The record recently made surpasses the previous record made on the Big Creek project by 10 ft. and also the record of several years ago of 11 ft. per day made on the Los Angeles Aqueduct. The daily average of all camps of the Edison company during 1923 was 15 ft.

To Overhaul Yakima Valley System.—The Pacific Power & Light Company has undertaken work of overhauling all its power service lines in the Yakima Valley, near Yakima, Wash. The work includes resetting of poles after they have been creosoted and the rewiring of circuits.



The Prairie Schooner

THE HAZE of time dims the *Old West*. But through it we still can picture the dust-covered Prairie Schooner, reminiscent of trackless plains, sage-brush, camp-fires and the scent of frying bacon.

Prairie Schooners traveled in caravans, the better to protect against that ever-present menace—Indians. A part of the faded picture is the old dog, panting at the heels of the travel-worn horses—the stove-pipe thrust through the roof of the canvas-covered wagon.

The Prairie Schooner was of the day of hardships, before the advent of the railroad, the telephone, the street-car—before gas superseded cord-wood and kindling, before electricity shouldered the oil lamp into obscurity.

Public Utility institutions such as ours have thrust aside the old discomforts and inconveniences. Without Utility service it would not be a far cry to the historic days of the Prairie Schooner.

The Natrona Power Company

This is No. 1 of a series of glimpses of the *Old West*.

The first advertisement of a series telling of the Old West is reproduced above. Copy is furnished by the Rocky Mountain Committee on Public Utility Information, the signature being inserted by the central station that pays for the advertisement.

Lighting Educational Committee Details at N.E.L.A. Meet

During the convention of the National Electric Light Association, to be held at Atlantic City, N. J., May 19-23, official announcement will be made of the formation of the Lighting Educational Committee. In this committee will be vested the executive control of the Better Home Lighting Activity, an undertaking in the interests of all branches of the electrical industry with its chief objective the education of the public to the importance of the proper use and distribution of electric light.

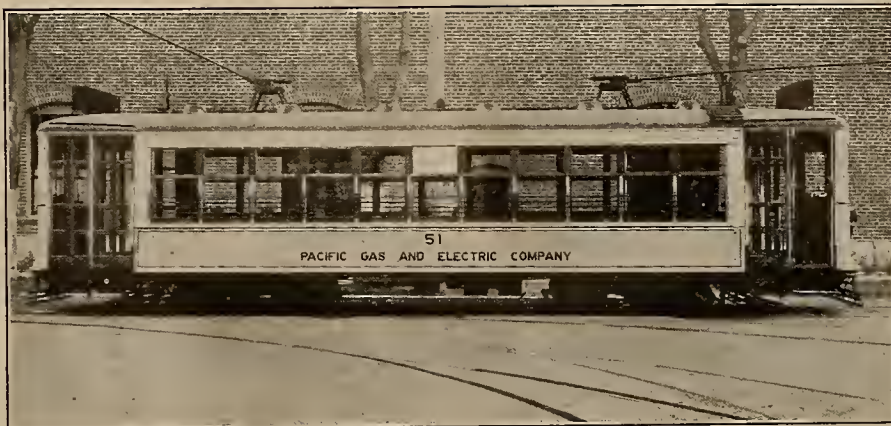
The committee is composed of glass manufacturers, fixture manufacturers, lamp companies, central stations, jobbers, contractors and dealers, represented by the chairmen of the executive committees of the different groups. The necessary financial support has been pledged and will be contributed by every branch of the electrical industry interested in lighting.

One of the features of the Better Home Lighting Activity will be a nation-wide prize essay contest, the national prize for which will be a \$15,000 electric home. Full details of this contest will be explained at the convention. The Lighting Educational Committee will also direct a series of instructions that may be used as bases for study courses on the effect of poorly distributed light.

The support of eyesight conservationists, the medical profession and other groups and organizations interested in the preservation and advancement of good health, is being solicited and received. The entire activity is to be non-commercial, the movement having grown out of the desire of foremost men in the industry to give the public a better understanding of the correct principles of lighting. James E. Davidson, of Omaha, Neb., vice-president of the National Electric Light Association, has been named as chairman of the Lighting Educational Committee, and will direct the entire activity.

Portland Electric Power Company Is New Name of Utility.—Change of name from Portland Railway, Light & Power Company to Portland Electric Power Company was authorized at a recent meeting of the directors of the company. The change will become official about the first week in May. One of the principal reasons for changing the name of the company has been the change in the company's principal activity. At the time of the organization of the Portland Railway, Light & Power Company 18 years ago, the principal activity was the operation of the street railway. Since that time the light and power business has advanced considerably and it is thought that the new style is more descriptive of the company's major operations. The company will continue to operate the street car system.

Appropriation Voted to Evaluate Power Company Properties.—The Board of Supervisors of San Francisco, Calif., has voted approval of an appropriation of \$10,000 to cover expenses of the city in the evaluation of the properties of the Great Western Power Company and the Pacific Gas and Electric Company with a view to acquiring them as a distribution system for power from the Hetch Hetchy project.



New type of street car recently put in service in Sacramento, Calif., by the Pacific Gas and Electric Company.

Equipment for Stave Lake Plant Ordered by B. C. Company

The British Columbia Electric Railway Company has let a contract for a generator, at \$500,000, to the Canadian General Electric Company, and for a turbine, at \$150,000, to the Allis-Chalmers Manufacturing Company. Smaller contracts bring the total value of the machinery up to \$680,000. The machinery is for the fifth unit at the company's Stave Lake plant.

The company's own men will erect an auxiliary high-tension transmission line from the Stave Lake plant to the Horne Payne station. Three hundred tons of copper wire will be used in the line. The company is making arrangements for another substation at a cost of approximately \$250,000, to prevent the overloading of transmission lines and to afford the additional capacity required in the development of Stave Lake and Alouette Lake districts.

Tacoma Electric Club Reorganized.—The Electric Club of Tacoma, Wash., has recently been reorganized, with the following officials: Charles Stewart, president; Frank Muehlenbrush, treasurer, and Carl Jebbers, secretary. The new trustees are William A. Mullins, W. J. Love and A. B. Ball. The club holds a weekly luncheon at the Olympus Hotel. Plans are under discussion for a joint picnic during the summer with the Seattle Electric Club.

Rocky Mountain League Increases Office Space.—Owing to increase in its activities and the need for larger quarters the Rocky Mountain Electrical Co-operative League has taken additional office space and now occupies rooms 808 and 809 in the McIntyre Building, Salt Lake City, Utah. C. L. Collins is the new secretary and from the above address will direct all activities of the League.

Satisfactory Progress at Utah Steel Plant.—Reports from Ironton, Utah, indicate that work on the plant of the Columbia Steel Corporation at that point is progressing satisfactorily. Several batteries of three coke ovens each are producing coke with which to operate the principal unit of the plant. When sufficient coke has been produced, the blast furnaces will be placed in operation. It is expected that this will occur about May 1.

Carload of Ranges Ordered for Medford, Ore., Region

A carload of Hotpoint-Hughes electric ranges of various models has been ordered by The California Oregon Power Company from the Edison Electric Appliance Company. The ranges will be distributed from the Medford, Ore., headquarters of the power company to the dealers in northern California and southern Oregon who are co-operating with the Copco organization in range merchandising.

The company has conducted several exceptionally productive range campaigns on its system and is preparing for active merchandising work during the spring of 1924. The company's promotional activities are of an educational nature only, the contractor-dealers making the actual sales. Through the cooperative efforts of the dealers a saturation of one range to every five consumers has been reached on many parts of the Copco system.

Snowfall and Water Conditions in the Northwest.—A summary compiled by Edward L. Wells, of Portland, Ore., weather bureau meteorologist, shows the snowfall in Oregon below normal and the outlook for less than normal flow in all streams, with an early crest of between 16 and 17 ft. and a relatively rapid fall afterwards. The snowfall in the Columbia River drainage district in Washington is reported as one of the least on record, and is below average in the upper Columbia area in British Columbia as it is also throughout Idaho. In Montana a survey would indicate strong spring floods. In the Snake River drainage basin in Wyoming it is estimated that the depth of the snow is about normal but with a water content 25 per cent less than normal so that the maximum flow will probably be less than normal.

Safety Meetings Held By Washington Companies.—At a safety rally held in the Masonic Temple in Seattle, Wash., recently, five hundred employees of the Puget Sound Power & Light Company and the Tacoma Railway & Power Company were present. The program arranged by J. E. O'Brien, safety engineer for the companies, was designed to keep fresh in the minds of the workers the standards of safety which it is the aim of the two corporations to maintain.

Meetings

Announce Tentative Program for Northwest Convention

A tentative program for the annual convention of the Northwest Electric Light and Power Association to be held at Gearhart, Ore., June 25-27, has been announced by George L. Myers, president of the association and assistant to the president of the Pacific Power & Light Company. The first session of the convention, on the morning of June 25, will be addressed by Mr. Myers who will present the president's address and by Franklin T. Griffith, president of the Portland Railway, Light & Power Company. M. H. Aylesworth, managing director of the National Electric Light Association, will speak at the afternoon meeting and "The Indeterminate Permit" is to be the topic of an address to be given by John A. Laing, vice-president and general attorney of the Puget Sound Power & Light Company. A. A. Smith, secretary and general attorney, Eastern Oregon Light & Power Company, is to use "Taxation" as the topic of an address to be presented at the same session. A paper on "Merchandise Accounting" also will be presented during the afternoon.

The morning of the second day will be devoted to an open session of the Public Relations Section with Norwood W. Brockett, chairman of the executive committee of the section, presiding. The golf tournament will be held in the afternoon and the evening will be taken up with a resumption of the session of the Public Relations Section.

Meetings of the Accounting, Commercial and Technical Sections will be held on the third day. Each section will hold separate meetings and the chairmen of the sections will preside. The evening of the third day will be devoted to the proceedings of the Executive Session, which will consist of reports of committees, amendments to the constitution and the election of officers.

San Diego Electric Club Visits Local Generating Plants

With forty young ladies, employees of the power company and representing the Women's Public Information Committee, as guests, the Electric Club of San Diego, Calif., visited the power stations of the San Diego Consolidated Gas & Electric Company following the April 22 evening meeting. The Better Power Company Cooperation Committee, with "Doc" A. E. Holloway as chairman, was in charge of this special meeting.

Following supper at the Maryland Hotel, the entire club was taken in automobiles to Station A, the pioneer central station of that city. Here they were met by the power company employees' band and then divided into groups with special guides attending each group and escorted through the plant. The visitors were shown also the shops, storerooms and offices attached to the plant.

Station B, the main generating station in San Diego, was next visited, the guests being shown the new boiler equipment, the largest oil burning boilers on the coast, and the turbo-generating equipment. Winding up the evening was a trip to the new substation C of the company, which is considered the show room of the system, architecturally and from the standpoint of modern equipment.

Talk on Grand Canyon Trip Made by Hydraulic Engineer

E. C. LaRue, hydraulic engineer of the United States Geological Survey, delivered a narrative lecture at Salt Lake City, Utah, on the evening of April 16, his subject being "A Boat Trip Through the Rapids and Canyon Gorges of the Colorado River." The talk was illustrated with moving pictures and lantern slides. This event took the place of the regular monthly meeting of the Utah Society of Engineers, and was presented to the public under the auspices of that organization.

Before a large crowd Mr. LaRue told of some of the thrilling experiences of the Birdseye party which was thought

COMING EVENTS

National Electric Light Association—

Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—

Absecon, N. J.
May 26-29, 1924

American Association of Engineers—

San Francisco, Calif.
June 11-13, 1924

Pacific Coast Electrical Supply Jobbers' Association—

Quarterly Meeting—Coronado, Calif.
June 12-14, 1924

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—

Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association

Annual Convention—Gearhart, Ore.
June 25-27, 1924

to have been lost in the Grand Canyon of the Colorado last summer while on an expedition made for the purpose of locating possible power sites.

Joint Meeting Held by Salt Lake City Utility Employees.—The Salt Lake City, Utah, employees of the Utah Power & Light Company and the Mountain States Telephone & Telegraph Company held a joint meeting on the evening of April 16. This was the date for the regular monthly meeting of the power company employees, and the telephone people were invited to occupy the main part of the program. After a program of musical entertainment by several members of the telephone organization, an exceedingly interesting and instructive demonstration of the modern telephone switchboard was given. This was followed by "First-Aid" demonstrations by four teams, each team composed of five members of the telephone company. This was the first meeting of its kind held in Salt Lake City.

"Own Your Home" Exposition in Tacoma Is Successful

The "Own Your Home" Exposition in Tacoma, Wash., April 7-13 by the Own Your Home Association, was a signal success, and plans are already being formulated to repeat the exposition again next year. At the exposition there were more than 100 exhibits of home planning and building, labor-saving devices, and a \$5,000 "Dream Home" completely furnished and equipped. Entertainment features included a vaudeville program, educational exhibits and lectures.

An entrance fee of 25 cents in the afternoon and 35 cents in the evening was charged, and figures show that more than 32,000 attended the exposition during the week. The exposition advertised the fact that "You can't spend a cent after you get in," and all entertainments were without charge.

The "Dream Home," a completely equipped \$5,000 bungalow, was auctioned off the last night of the show, but since the bids offered were unsatisfactory, the concerns contributing the material will purchase lots and move the building there, to be later sold.

The Blue Bird Electric Shop of Tacoma offered a Universal electric range as a wedding present to the bride to be married in the "Dream Home." Electrical exhibits throughout the show were interesting and complete.

Sacramento, Calif., Contractors and Dealers Hold Meeting

The regular meeting of the Electrical Contractors' and Dealers' Association of Sacramento, Calif., was held Thursday, April 10, 1924, at 7:45 p.m. C. V. Schneider of the Electrical Supply Company presided. F. W. Forsyth, Wholesale Electric Company, San Francisco, Calif., addressed the members on the subject of electric air and water heating. G. M. Rankin, field representative of the California Electrical Cooperative Campaign, was a guest at the meeting.

Convention Date Set by Wyoming Utility Association.—A convention date has been set by the Wyoming Public Utilities Association, according to an announcement of H. C. Chappell, secretary of the organization. It is now planned to hold the meeting June 23-24 in the new office building of the Natrona Power Company at Casper, Wyo. E. P. Bacon, general manager of that company, is president of the association. The coming convention will mark the first meeting of the organization since March, 1922.

New Radio Set Described to Portland Engineers.—The regular meeting of the Portland, Ore., branch of the American Institute of Electrical Engineers and the National Electric Light Association was held on April 9 at the University Club. The speaker was Ellery Stone of the radio department of the Pacific States Electric Company, the Coast representative of the Radio Corporation of America. Mr. Stone spoke on the principles of the latest design for a receiving set and illustrated the set with blackboard drawings. He also showed a film describing the growth and development of the radio, and had on display a new receiving set.

Manufacturer, Dealer and Jobber Activities

Edison Electric Appliance Company, Inc., Chicago, Ill., has recently placed on the market a new cooking unit known as the "C6." It is designed for use in place of one of the surface units of the new Hotpoint range and may also be applied to the Hotpoint Hughes and to certain of the old General Electric ranges. The unit is particularly adapted to such cooking operations as boiling, braising, pot-roasting, steaming, stewing, the preparation of soups and to some kinds of roasting and baking. The "C6" unit consists of a heavily insulated cylindrical compartment equipped with a special heating coil and a five-quart aluminum cooking vessel and cover. It is designed to be connected to the surface-unit cord and plug, and is thus controlled by the regular range switch. Three heats provide a rapid preheating "high"—660 watts—a boiling "medium"—110 watts—and a simmering "low"—90 watts.

Mercury Manufacturing Company, Chicago, Ill., has recently published Bulletin A-105. The leaflet is entitled "The Trackless Train" and is devoted to a description of the company's "Lif-Trans" trailer designed for transporting large reels of cable. The trailer is constructed to be used in connection with an electric tractor, as current for operating the motor of the trailer is drawn from the tractor. The trailer is designed to carry a maximum load of 10,000 lb.

Jefferson Electric Manufacturing Company, Chicago, Ill., has placed on the market a new long wave transformer for use with Heterodyne or Super Heterodyne radio receiving sets.

The Waage Electric Company, Chicago, Ill., has opened a branch office at 1622 West 16th Street, Los Angeles, Calif. This office will be in charge of Theodore Waage and will serve as the Pacific Coast branch of the firm. H. J. Gute & Company, San Francisco, will continue to represent the line in northern California.

The Holophane Glass Company, Inc., New York, N. Y., has recently issued a 12-page illustrated booklet entitled "4-Way and 2-Way Holophane Refractors for Street Lighting." This booklet describes in detail the construction application of the new asymmetric 2-way and 4-way refractors for street lighting purposes. In general, the 2-way refractor is designed to be used between blocks and the 4-way refractor at street intersections. It is claimed that the advantage of the new asymmetric refractors over the symmetric refractors is that the light is confined to the street and is not wasted on the adjacent buildings. Copies of the booklet, known as Bulletin No. 357, may be obtained upon application to the manufacturer.

Henry D. Sears, Boston, Mass., has recently prepared what is known as the Candelite poster. The poster, suitable for display purposes in dealers' stores, is devoted to a description of a new device designed to make candle type fixtures out of bracket or ceiling type fixtures.

Harvey Hubbell, Inc., Bridgeport, Conn., has recently prepared for distribution a new line of pull receptacles for metal signs, ceiling fixtures and outlet boxes. The receptacles are equipped with removable skirted rings which hold the receptacles in place and at the same time, insulate the screw shells from the metal fittings.

Crouse-Hinds Company, Syracuse, N. Y., has sent the trade Folder No. 12, which is devoted to its line of Condulets for concealing in concrete. The folder contains illustrations of typical jobs on which the material is used and describes the utility of the line. The company has also published Bulletin 2057 which contains illustrations of Vaporproof Condulets with reflectors. This bulletin also contains a price list of parts.



Harry Woodward, of the Great Western Power Company, San Francisco, Calif., captured the golf tournament cup at the Stockton meeting of the California State Association of Electrical Contractors and Dealers. Presentation ceremonies were fittingly conducted by Tom Bennett of the Rex Electric Company.

The Cutter Company, Philadelphia, Pa., has recently mailed to the trade a folder describing the I-T-E circuit breaker designed for 600 volts a.c. The folder presents an illustration of the air-break switch and information concerning the salient features of the device.

The McGill Manufacturing Company, Valparaiso, Ind., has developed a white glazed porcelain bracket for bath rooms, kitchens, hospitals, etc. The method of operating the socket portion is claimed to be distinctly different from anything thus far developed. The lever not only serves as the operating control but also as a finishing knob. The position of the socket may be reversed if desired so that the lamp is straight down. The bracket is artistically and substantially designed and harmonizes with the majority of bathroom, kitchen and hospital fixtures.

The Line Material Company, South Milwaukee, Wis., is erecting a two-story addition and rebuilding its present plant. The new building will be a modern daylight type of structure, increasing the factory space to practically 100,000 sq. ft., and doubling the present production capacity of the plant. Building operations will be completed by July 1, 1924, it is expected.

The Lionel Corporation, New York, N. Y., makers of Lionel miniature electric trains and equipment, has put on the market a new twin-motor locomotive to fit O gage track. This locomotive is the first twin-motor type ever produced for this narrow track.

The General Electric Company has recently placed on the market two new types of induction motors. The SCR single-phase motors are designed for constant speed at 60, 50 or 40 cycles, in sizes from ½ to 10 hp., and are interchangeable for 110 or 220-volt circuits. The KT-900 type is a riveted frame, polyphase induction motor, of three- and two-phase, squirrel cage, 60-cycle design, and is being sold in sizes ranging from ½ to 15 hp.

Johns-Pratt Company, of Hartford, Conn., has recently published an 8-page booklet devoted to a description of Noark underground boxes. The publication is replete with illustrations of the company's line of underground boxes.

The Estate Stove Company has recently opened a Pacific Coast office and sample room at 523 Market Street, San Francisco. The company will maintain its display in the Furniture Exchange Building.

Monitor Controller Company, Baltimore, Md., has developed the Triplock double-pole switch, which is an electrically operated, mechanically locking switch that cuts off its own operating current. The manufacturer states that there is no current in the switch coils except during the instant of closing and opening. Energizing one coil closes the switch, locks it mechanically in the closed position and automatically opens the circuit for that coil. Energizing the other coil opens the switch and automatically opens the circuit for that coil. As the switch itself opens the circuits for the operating coils as soon as the desired opening or closing movement is completed, the new switch may be used with a maintained contact form of remote control, if desired. At the present time, this switch is built only in 30-amp. size. Larger capacities will be developed later.

The Acme Electric & Manufacturing Company, Cleveland, Ohio, has brought out a new type of battery charger for radio A and B and also automobile batteries. The new charger is built in 2 and 5-amp. sizes with an attachment on both sizes to charge up to and including 36 B-type cells. The construction is such that radio A batteries can be charged while the set is in operation.

Ajax Electric Specialty Company, St. Louis, Mo., has prepared for dealers' use a new price tag of novel design. The tag carries on one side places for indicating the make of the device, the type, price and cost. On the reverse side appear four applications of Ajax plural socket plugs. This side of the tag is printed in red and black. The tag is 2¼ x 1¼ in. The company is packing five of the tags with each display carton of its plural socket plugs.

Personals

John V. Strange, assistant general manager of the Pacific Power & Light Company, with headquarters in Portland, Ore., on May 1 became operating manager of the Carolina Power & Light Company, Raleigh, N. C. The Eastern company, like the Pacific Coast company, is a Bond and Share property,



JOHN V. STRANGE

therefore Mr. Strange remains in the same general organization. Mr. Strange has spent the last thirteen years with the Pacific Power & Light Company, the last five years as assistant general manager. Starting in 1911 in the stores department at Kennewick, Wash., he was stationed, successively, as local manager at Prosser, Wash., Hood River, Ore., and Pasco-Kennewick, Wash. At Raleigh he will be employed in work similar to that at Portland. Mr. Strange is possibly best known through his work in the commercial sections of the National Electric Light Association and Northwest Electric Light and Power Association, in which he has frequently held assignments.

J. W. Carey has been appointed chief engineer of the Washington State Department of Public Works, succeeding Herbert J. Flagg, resigned.

Louis C. LaMont, office manager of the Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., has recently gone to Pittsburgh, Pa., and other Eastern points where factories of that organization are located.

G. M. Rankin, field representative of the California Electrical Cooperative Campaign, recently spent several days in the Sacramento Valley. He attended the meetings of the Sacramento Valley Electrical Society and the local Electrical Contractors' and Dealers' Association.

H. J. Miller has recently joined the Los Angeles, Calif., office of the General Electric Company as specialist in fractional horsepower motor sales. He takes the place of R. E. Boyle, who was transferred to the Cleveland, Ohio, office of that company as manager of the fractional horsepower sales division in that district.

H. W. Young, president of the Delta-Star Electric Company, Chicago, Ill., is making an extended trip to California and other Pacific Coast states.

W. F. Clark, general manager of the Automatic Electric Water Company, Warren, Pa., has recently left San Francisco, Calif., where he has been on business for his company.

Herbert A. Cram, California manager of the electrical department of Landers, Frary & Clark, with headquarters in San Francisco, was a recent Los Angeles visitor.

S. B. Gregory of the Arrow Electric Company of San Francisco, Calif., was a recent visitor to Los Angeles.

S. Rosenfield, of the United Electric Supply Company, Salt Lake City, Utah, is in Denver, Colo., on business for his company.

F. M. Cockrell, formerly promotion manager of McGraw-Hill Company, Inc., and more recently manager of the industrial department of Campbell-Ewald Company, has joined the staff of The Society for Electrical Development. He will supervise the program for the development of more adequate wiring.

Burton Y. Gibson, Pacific Coast manager for the Walker & Pratt Manufacturing Company, Boston, Mass., has just returned from an extended trip to the Northwest. Mr. Gibson spent two and one-half months in sales work in that territory and reports favorable business conditions.

N. B. Acers, factory representative in Denver, Colo., of the Delco Light Company, Dayton, Ohio, is on a trip to the factory to attend the annual sales convention of the company.

W. H. Rademacher, special representative of the Edison Lamp Works of the General Electric Company, Harrison, N. J., was a recent Los Angeles, Calif., visitor. Mr. Rademacher is making a tour of the Pacific Coast in the interest of his company and while in Los Angeles delivered a lecture on the subject of "Modern Illumination, Its Merchandising and Application."

Robert Moffit, formerly with The Washington Water Power Company, engineering department, has been appointed by the Associated Engineers to represent that association at the world power conference in London, England, this summer.

T. L. Nightingale, electrical contractor of Sacramento, Calif., was recently in San Francisco on business.

E. Birkel, formerly of Birkel & Merrigold, fixture manufacturers and dealers, Los Angeles, Calif., and George E. LeGassick, formerly sales manager for Meyers Electric Company, Los Angeles, have opened a wholesale electric supply house at 702 Santa Monica Boulevard, Los Angeles, where they have stocked a complete line of electrical supplies for the contractor and dealer.

H. D. Randall, district manager of the General Electric Company, Denver, Colo., and A. C. Cornell, district manager of the Western Electric Company, Denver, were visitors in Salt Lake City, Utah, early in the month in connection with business of branch offices in that city.

Walter T. Wells has resigned his position as general sales manager of the King Manufacturing Co., Chicago, Ill., to return to his family in Denver, Colo., where he is engaged in developing some private undertakings not affiliated with the electrical industry.

G. A. Swain, assistant to the manager of the supply sales department, Westinghouse Electric & Manufacturing Company, has been elected chairman of a new section of the Electric Power Club. This section, which includes instruments and instrument transformers, was recently organized. Mr. Swain, who is chairman of the Instruments and Measurements Committee of the American Institute of Electrical Engineers, has also been appointed chairman of the Institute's section for revising the Institute's standardization rules pertaining to instrument transformers.

Carl L. Wernicke, since 1907 manager of the Portland, Ore., office of the Westinghouse Electric & Manufacturing Company, has undertaken the work of special representative of that company. As such he will be relieved of his former detailed office duties and will devote the larger part of his time to the central station business of the company.

F. H. Woodward, general sales manager of the Great Western Power Company of California, San Francisco, Calif., was recently in Sacramento on business. He was one of the speakers at the meeting of the Sacramento Valley Electrical Society.

E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, with Mrs. Herr, recently spent four days in Seattle, Wash.

R. G. Chamberlain, district sales manager of The Hurley Machine Company, Seattle, Wash., is in Spokane in connection with sales matters.

Ray W. Turnbull, assistant Pacific Coast sales manager of the Edison Electric Appliance Company, Portland, Ore., was in Spokane, Wash., recently.

V. R. Hughes, of the Pacific Gas and Electric Company, was elected a member of the executive committee of the Society of Safety Engineers of California at the recent annual meeting.

John Hood, who was for several years engineer of the San Francisco, Calif., office of the General Electric Company and for the past three years has been assistant manager of Catton-Neill &



JOHN HOOD

Company, Limited, an engineering and manufacturing firm of Honolulu, T. H., which acted as Hawaiian representative of the General Electric Company, has been appointed manager of the Oakland, Calif., Works of the General Electric Company. Mr. Hood took up his new duties March 1.

Ross B. McElroy has been appointed assistant sales manager of The Washington Water Power Company, Spokane, Wash. Born in Spokane Sept. 1, 1890, Mr. McElroy graduated in electrical engineering from the Washington State College, Pullman, Wash., with the class of 1913 and on graduation entered the service of The Washington Water Power Company in the commercial department. During the first few years he gave his attention to residential lighting and especially the proper wiring of new homes. Later he worked into the general commercial work in the business district, handling general light-



ROSS B. McELROY

ing and store accounts, and in July, 1922, he was given charge of the Electric Shop. Mr. McElroy is active in civic affairs, being a member of the University Club, Chamber of Commerce, Spokane Advertising Club and Electric Service League. As chairman of the Electrical Home Committee of the Service League in July, 1922, he was largely responsible for the success achieved.

F. W. Forsyth, of the Wholesale Electrical Company, San Francisco, Calif., recently spent several days in Sacramento on business. While there he addressed the local Electrical Contractors' and Dealers' Association, and also attended the meeting of the Sacramento Valley Electrical Society.

B. C. Holst, representing W. N. Mathews Corporation, has moved his offices from the Furniture Exchange Building, San Francisco, Calif., to Rialto Building, that city.

W. J. Dennis has been appointed assistant to L. T. Merwin, general manager of the Northwestern Electric Company, with offices in Portland. Mr. Dennis was formerly the head of the sales department and his successor has not yet been named. He has been active in his company for the past ten years and for a like period before that time he was superintendent of the plant of the Ames-Harris-Neville Company. He came to Portland from Texas.

F. S. Mills, of the San Francisco, Calif., office of National X-Ray Reflector Company, was a recent visitor to Salt Lake City. While there he gave an address before the luncheon of the Lighting Bureau.

A. A. Tufford, for over seven years with various offices of the Northern Electric Company, in Canada, has joined the staff of the H. B. Squires Company, San Francisco, Calif.

J. C. Ralston, of Spokane, Wash., has been elected chairman of the Committee on Reforestation and Timber Supply of the American Engineering Council. C. C. Thomas of Los Angeles, Calif., is also a member of the committee.

A. T. Fish, sales manager, and Luther G. Poe of the A. J. Lindermann & Hoverson Company, Milwaukee, Wis., are making an extensive tour of the Pacific Coast. They have already been to the major cities of the Northwest and will visit southern California before returning to the factory.

Fred Todt, San Francisco, Calif., district manager of the Pacific States Electric Company, is on an extended trip to Eastern cities.

H. E. Sandoval, manager of electric sales, Pacific Gas and Electric Company, San Francisco, Calif., recently made a business trip to Sacramento.

W. H. Hodges, advertising and publicity man of the H. M. Bylesby public utility properties throughout the West, is now on a trip of inspection. The Mountain States Power Company is one of the big properties owned by the corporation.

W. B. Wallis, president of the Pittsburgh Electric Furnace Corporation, Pittsburgh, Pa., is visiting Pacific Coast cities in the interest of his firm. Mr. Wallis has already spent some time in Los Angeles and San Francisco, Calif., and will investigate conditions in the Northwest.

Mortimer Fleishhacker, San Francisco, Calif., banker and one of the principal owners of the Northwestern Electric Company, Portland, Ore., was a recent visitor in that city. Mr. Fleishhacker expressed himself as well pleased with the financial condition of the company which will spend about one million dollars this year in system betterments.

I. W. Frank, director of the Copperweld Steel Company, Ruskin, Pa., is visiting Pacific Coast cities in the interests of his company. Mr. Frank has already spent some time in San Francisco, Calif., and is now in Los Angeles.

Jack Hawkins, western sales supervisor of the Apex Electric Distributing Company, with headquarters in Kansas City, Mo., is visiting Denver, Colo., and other points in the western section of his territory.

Harry B. Joyce, assistant general manager of the Ideal Electric and Manufacturing Company, Mansfield, Ohio, manufacturers of synchronous motors and generators, was recently in Los Angeles, Calif., on business conferring with his representative, Lombard J. Smith.

S. C. Powell, manager of the Republic Creosoting Company of Seattle, Wash., was recently in Los Angeles, Calif., on business for his company.

D. H. McCulloch of the Electric Service Company, Sacramento, Calif., was a recent visitor to San Jose in connection with business.

M. Givens, formerly in the electrical contracting business in Plainfield, N. J., has established a contractor-dealer business in his new building at 1305 East Colorado Boulevard, Glendale, Calif.

M. C. Osborn, in charge of electric range promotion for Landers, Frary & Clark and formerly prominent in utility circles in the Northwest, visited his old home in Denver, Colo., in March while on a business trip in the mountain region.

Francis L. Landon, industrial sales engineer of the Pacific Gas and Electric Company, was recently transferred from the Sacramento, Calif., office to San Francisco. He has served in the construction department, meter department of the San Jose division, and in the illumination sales and industrial sales departments of the Sacramento division. In his new position he will have increased responsibilities doing creative work.

C. C. Hillis, president and general manager of the Electric Appliance Company, San Francisco, Calif., has just returned from an extensive trip to eastern factories. Mr. Hillis visited Providence, R. I., New Britain, Conn., and other industrial centers.

O. F. Lackey, vice-president of the Colorado Springs Light, Heat & Power Company, has returned to Colorado Springs, Colo., after a prolonged trip to his old home, Baltimore, Md.

Chester Lichtenberg of the engineering department of the General Electric Company, Schenectady, N. Y., was in Spokane, Wash., April 17, and gave a talk before the engineering department of The Washington Water Power Company on the subject of "Automatic Operation of Power Stations and Substations," and on the use of telegraph systems for system load dispatching. Mr. Lichtenberg will visit the other important Coast cities on his trip.

Obituary

H. T. Van Riper, sales manager of the Chicago district of the Edison Electric Appliance Company, Inc., died April 3. He was forty-five years of age. Mr. Van Riper, who was the first Hotpoint salesman, in the beginning traveled over the United States and Canada, as well as Mexico, securing new accounts and establishing connections for Hotpoint appliances. He later took up the intensive development of Oregon



H. T. VAN RIPER

and Washington for the Hotpoint company, which in time was merged into the Edison Electric Appliance Company. In 1922 he was appointed district sales manager of the St. Louis, Mo., district, covering seven states; and in 1923 was made sales manager of the Chicago, Ill., district.

Trade Outlook

San Francisco

The spread of the hoof and mouth disease among cattle in the country districts is having an inevitable effect upon business conditions in San Francisco. Jobbers report sales in these districts retarded, and the necessarily strict quarantine measures imposed on shipments from infected areas have resulted naturally in a certain amount of indirect loss to business in general.

Trade, wholesale and retail, is in fair condition, although wholesale hardware men report business as behind that of last year. Activity is reported in manufacturing and industrial lines. Building operations continue in good volume, and the demand for construction materials is holding up well. There is considerable activity in home building in the outlying residential districts which should react favorably on the electrical fixture and appliance trade.

Building permits for the first quarter of 1924 amounted to 2,561 with a valuation of approximately \$11,743,512. This is an increase of about 3.4 per cent over the corresponding period in 1923 when 2,477 permits were issued valued at about \$9,714,059.

Statistics compiled by the Chamber of Commerce show 1,315 new commercial, industrial and other enterprises for the months of January, February and March of this year.

Collections are stated as fair to good.

Portland

A feeling of uneasiness is general in the lumber business. Most mills have either reduced the number of shifts or are running part time. There are numerous threats of price weakening in lumber, but no marked reductions are reported. Many men have been thrown out of employment.

At the same time building construction in Portland has gone ahead in large volume. Residences and small business blocks are in good demand and lots continue to move well. Material men expect the largest year's business in the history of the city.

There is some foundation for the statement that capital is being held out awaiting reductions in lumber and material. Offsetting this argument is a recent wage award to the electrical workers of both the local power companies granting a substantial increase in pay.

There has been some falling off in trans-Pacific shipping, resulting in withdrawal by the Shipping Board of six vessels from this port.

Los Angeles

The sale of electrical retail products was good during the first two weeks of April and showed improvement over the latter part of the month of March. This is true of radio sets and supplies as well as of electrical appliances. Manufacturers report good business prevailing both in supply and industrial lines. However, the sale of wholesale

electrical supplies by jobbers has not been up to that of other branches of the industry. This, in a measure, is attributed to the slump in building activities, which though somewhat larger than last year's, are not keeping pace with the growth that was expected. It has also been due to the hoof and mouth epidemic which has caused a number of plants and factories to close down. This in turn has caused an oversupply of labor and a gradual slowing up of business.

Building permits for the first two weeks in April amounted to 2,460 with a valuation of \$7,917,983, as compared to the corresponding period in 1923 when 2,444 permits were issued with a valuation of \$7,451,432. This represents an increase of only about 6 per cent. Bank clearings for the same period amounted to \$300,028,461.70, which shows an increase of about 13 per cent over the corresponding two weeks of April, 1923, when they amounted to \$264,417,471.18.

Denver

General conditions remain uniformly good except for seasonable curtailment of outdoor activities due to changing weather. Iron and steel plants, foundries, and machine shops are operating steadily with increased activity assured from industrial demands.

Prospects for another good agricultural season are excellent, with winter wheat in fine shape due to favorable moisture conditions. Excessive rainfall has somewhat retarded spring plowing and farming operations. As a further consequence, farm labor demand is not up to the supply, a condition largely due to the influx of unskilled labor from other portions of the country, especially the West Coast.

Bank deposits have decreased, due to heavy disbursements in the form of dividends and interest and the usual seasonal withdrawals by country banks, which are just commencing to finance farmers. Financial conditions are improving in the southern portion of the mountain region.

The electrical industry is doing a satisfactory volume of business, superior to most lines, due to the continued building operations, central station improvements and extensions, and industrial demands. Summer business fully as good as last year is anticipated.

Seattle

The Seattle electrical industry reports a good volume of business done during the first quarter of 1924, but shows a decline of between 10 and 15 per cent in that volume as compared with the aggregate for the first three months of 1923. What might appear to be a slump is explained by the fact that the volume of business moving in the first quarter of last year was unusually large.

Supply materials are furnishing the greatest movement in the present

trade. Installations of new equipment are less frequent than last year, but the replacement volume is good. With a slackening in the lumber industry in the Northwest, a slowing down in the electrical trade was perceptible. Prices are fairly well stabilized, and no appreciable changes are expected.

The lumber industry is in an unsatisfactory condition at present, with many of the mills closed and few operating two shifts. Drastic reduction in log prices is reported.

Building construction continues heavy, this condition existing in practically all the Puget Sound cities. Residence building is particularly active, and demand for the higher grade electrical fixtures and household equipment is showing a steady increase.

Salt Lake City

The first of the final steps in making iron out of Utah ore and coal was taken on April 14 when the byproduct coke ovens at the Ironton plant of the Columbia Steel Corporation were given the primary charge of coal. It is expected that blast furnaces will be blown in some time before May 1. The development of this iron and steel industry is looked upon as being of immense importance as a factor in the industrial activity of this section.

According to the monthly crop survey prospects are exceedingly good for winter wheat, which adds to the encouragement of the farmers for a prosperous season.

General demand for farm and mine labor, mining activity, and plans for increased industrial expansion are highlights in the outlook for business conditions in the intermountain territory.

Electrical jobbers continue to show an increased volume of business. As the irrigation season approaches and new projects get under way, there is anticipated an increased demand for electrical pumping equipment.

Collections continue to improve, as shown by comparative figures both for the same period last year and for the earlier months of this year.

Spokane

With the arrival of spring a general quickening of business activity is noted. Building permits continue to gain and many houses and other important jobs are under construction. The Eagles have announced the construction of a new lodge building costing \$500,000.

An electric range campaign being conducted by The Washington Water Power Company shows weekly totals running above those reported in a similar campaign a year ago. Retailers are reporting good demand for spring goods.

The lumber business is characterized by some uncertainty, with a marked falling off in price for sash and frame. Considerable attention is being given to the utilization of short length and waste stock, of which a large amount is produced, and extensive markets are being opened up.

Mining activities in the Coeur d'Alene district of Idaho, in Northeastern Washington, and British Columbia continue brisk. A number of new mills and concentrating plants have been reported.

Journal of Electricity

5 Cents a Copy

May 15, 1924

San Francisco



Buy certified electrical appliances

Patronize **"Check" Seal** contractors and retailers

PACIFIC STATES ELECTRIC COMPANY

Telling Your Story to Millions!

This year the "Check" Seal program is bringing the story of the qualified contractor and retailer to practically every person on the Pacific Coast. On billboards and in newspapers and magazines, with a combined circulation reaching millions, we are urging the public to "Buy Certified Electrical Appliances" and to "Patronize 'Check' Seal Contractors and Retailers."

PACIFIC STATES ELECTRIC COMPANY

OAKLAND

LOS ANGELES

SAN FRANCISCO

SEATTLE

PORTLAND

SPOKANE

ROCKBESTOS

—the asbestos covered wires

This is one of our Model A5 ranges, of which we have just installed 230 in the Schenley apartments in Pittsburgh, Pa.

It is the largest installation of electric ranges in the world, so we are told.

We are using ROCKBESTOS stove wire exclusively in our ranges and find it of very high quality and we think the best on the market.

Yours very truly,

The Standard Electric Stove Co.

by *Charles Hanson*
Mgr.

Model A5 electric range, installed in Schenley Apts. Pittsburgh Pa.

P/H

—are used exclusively by

The Standard Electric Stove Co.

This installation is a great tribute to **ROCKBESTOS STOVE WIRE.**

Always performs perfectly and never deteriorates.

The ideal and everlasting wire.

Heater Cord
Motion Picture Cable
Curling Iron Cord
Panel Wire
Stove Wire

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The Power of Publicity

PUBLICITY plays an important role in our present day civilization. Through the printed word ideas are disseminated that add grist to the wheels of progress. Were a man to depend entirely upon the spoken word for broadcasting his ideas the world would be today little farther advanced than it was four centuries ago.

Few men in the electrical industry realize the power for good in the journals which cater to their special problems. It must remain for the editors to call attention to examples of what the printed word will accomplish. For example, the following letter illustrates how an idea, once in type, ignores international boundaries and invades foreign countries.

Uji-Gawa Denki Kabushiki Kaisha
The Uji River Electric Power Company, Ltd.
Osaka, Japan.

Jan. 31, 1924.

The Pacific Gas and Electric Company,
San Francisco, California.
Gentlemen:

We have to take the liberty dropping a few lines and would say that we are so interested to read in the Journal of Electricity "Why Central Stations Should Investigate the Electric Truck" by Mr. Edward J. Power, director Electric Truck Bureau of your company and we are very earnestly to have all information regarding to cost data performance, figures, operating expenses, etc. for electric vehicle battery charging; and also electric equipment, its name and manufacturer, and its quotation which chargeable at some time for batteries of twenty electric trucks or more without any obligation to us. We believe that all information given by you is not only put knowledge into our idea but also profitable to our truck business throughout Japan.

Awaiting your reply to our desire at earliest convenience, we are

Very truly yours,

THE UJI-GAWA ELECTRIC COMPANY,
By Tomowo Yabey.

Among other things, the letter illustrates the desire of the Japanese to keep in step with the progress which is being made in the electrical industry in the United States. The hydroelectric resources of the country are extensive and the best practice is followed. It is not surprising therefore that the Japanese central stations should be interested in such a development as the electric truck.

“Single Wall Loom is Best”

Contractors have said it; jobbers have said it; we have said it; and now other manufacturers admit it by making this type.

When we started making non-metallic conduit, there were no Single Wall types. We originated the Single Wall construction.

We have never made any other type than Single Wall. We have spent our efforts on that type and have gone through the experimental stages, so that today we are experts in making a loom of this construction.

Since Contractors, Jobbers and Manufacturers agree that the Single Wall type is the best, you can do no better than use the original.

That means

DURADUCT

of course!

Tubular Woven Fabric Company

Pawtucket, R. I.

Pacific Coast Representatives

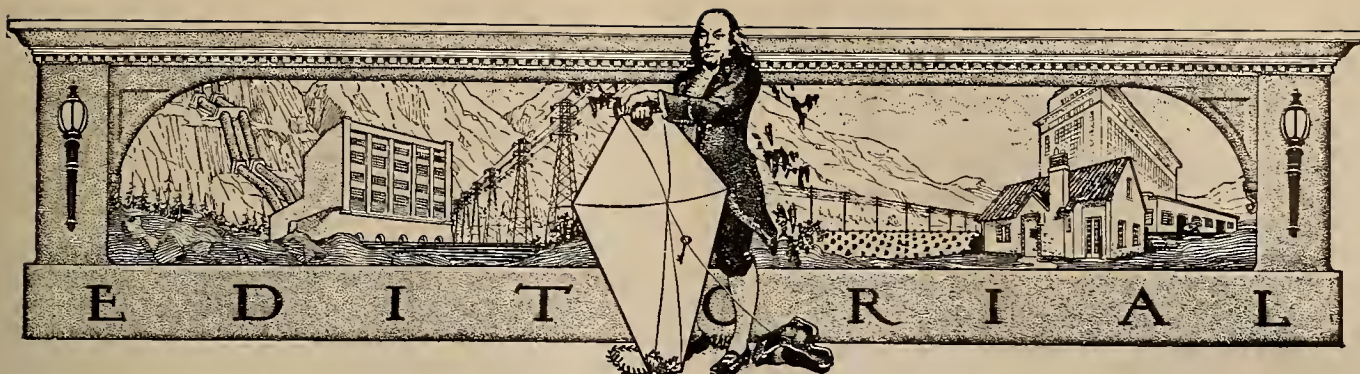
Allied Industries, Inc.

San Francisco
455 Second St.

Seattle
532 First Ave. So.

Los Angeles
1256 Factory Place

Portland, Ore.
53 Fourth St.



Again Politics Loses

ON Tuesday, May 6, the proposed bond issue of \$21,000,000 for sundry and various purposes of the Los Angeles Bureau of Power and Light was defeated, lacking some 2,400 votes of the necessary two-thirds majority to carry. The last figures available at time of present writing gave 104,224 votes for, and 55,757 against. There were a number of other bond issues on the same ballot. All of these, amounting to \$47,900,000 carried, the power-bond issue being the only one defeated.

IT is difficult to analyze this result, and give with any positive assurance a definite conclusion. It must be remembered that the city officials in charge of the Los Angeles Bureau of Power and Light have been working strenuously to involve the city deeper and deeper in their municipal power venture. In June, 1923, the Bureau came before the voters with a request for \$35,000,000. This proposal was rejected by a vote of some 41,264 for and 38,319 against, a two-thirds vote being required to carry.

IT is interesting to note that in the former case, a bare majority was secured for the bond issue, while in the latter, a mere handful of votes would have reversed the result. Again, note that in the former case less than 80,000 votes were cast, while in the latter practically twice that number evinced their interest in the point at issue.

PRO-PUBLIC ownership Los Angeles papers comment on this result as a virtual victory for government ownership. We must confess our inability to arrive at this viewpoint. On the contrary, the question at issue was not

whether the people were for or against their power enterprise. They are already committed to it. The question was whether or not the taxpayers were willing to give to their officials another \$21,000,000 to play with. In spite of a vigorous campaign waged for the bonds, the voters said "No," rather half-heartedly, but "No," nevertheless.

THE good people of Los Angeles seem to be in the unfortunate position of the banker, who, having loaned large sums of money to a client, must perforce loan him further sums in order to recover something out of his venture. It seems equally logical that if the voters would not stand for so great a sum as \$35,000,000 which they refused to grant in June, 1923, and if they interposed not quite so vigorous a "No" at the more modest request for \$21,000,000 a few days ago, they might give the Los Angeles Bureau of Power and Light some such paltry sum as ten or fifteen millions if they asked for it.

THE frantic appeals for more and more money would indicate that there was need for it, and we believe that there will be no cessation of this clamor until the taxpayers will be faced either with a failure of their power venture and therefore be compelled, willy nilly, to dig down in their trousers pockets and pay the bill, or perhaps a reversal of feeling will bring about a sentiment for the return of the enterprise to private ownership. In the meantime the city fathers of San Francisco, in debating the Hetch Hetchy power project, might learn much from their neighbor on the south.

Let Us Scotch the Rumor-Monger

THERE is something appealing about the man who stands up on his two feet and speaks his mind in public that all may hear. We may or we may not agree with him. Whether we do or not, we cannot do other than respect him for having the courage of his convictions and the manhood to proclaim them. The whisperer, the soft-spoken purveyor of back-door gossip, the "Don't repeat this as having come from me" male biped, all of these seem to be an unavoidable part of our social and business fabric. You know the type. Did you ever hear one of them say anything good about anybody or anything?

There is no known cure for the gossip himself. There is a preventive, however, and that is an unsympathetic hearer. The purveyor of rumors to the effect that So-and-so is in financial difficulties, that Such-and-such jobber is subsidized by the power company, that This-or-that manufacturer secretly controls a certain retail establishment, cannot peddle his poisonous wares to those who will not listen.

There is a little Japanese statuette that might well adorn the desks of all of us. There are three monkeys, who "Speak no evil, see no evil, and hear no evil." This idea is anything but new, but it must be repeated at intervals lest it be forgotten. There is much good that may be spoken. Why not concentrate on that, and turn a deaf ear upon the rumor-monger, who, if we are so foolish as to let him, may poison our minds against our best friends, and do incalculable damage. Let us give the benefit of the doubt invariably. We may need it ourselves.

A Possible Menace to the Success of Future Conventions

DURING June there will occur two of the most important conventions of Pacific Coast electrical interests during 1924. We refer to the meeting of the Pacific Coast Electrical Association at Coronado, Calif., and the sessions of the Northwest Electric Light and Power Association at Gearhart, Ore. Undoubtedly both gatherings will be characterized as "the most noteworthy in the history of the organizations."

It is the earnest desire of the officers of both associations to have these 1924 conventions go down in history as meetings of accomplishment. Undoubtedly such will be the case, for committees have worked ceaselessly during the past twelve months to prepare papers and reports which would prove worth while. It remains for those who attend the sessions to participate in the discussions and to derive therefrom ideas which they can apply to their own problems.

Right here, it might be well to point out a dangerous tendency that has been developing around such annual gatherings during the past few years. There has been too much thought of pleasure and not enough of business. Delegates have devoted time that should have been put in at section meetings to golf, dancing and conviviality. The feeling is becoming prevalent among all associations, and particularly

among the electrical industry, that unless there are produced more direct results for the time, money and effort spent on conventions, executives will have to limit sharply the attendance of employees. In fact, they may be forced ultimately to do away with conventions altogether.

As matters stand at present, the committees in charge of the convention programs try to make a rational division of time between work and pleasure. Plenty of play is provided at the right time. It remains for those attending to see to it that they themselves devote time and attention to the business features. Conventions are useful. They provide opportunity for necessary interchange of thoughts and ideas. The electrical industry must not allow future conventions to be jeopardized by failing to realize the importance of the meetings in which delegates are supposed to participate.

Why Discriminate Against One of the Youngest Electrical Industries?

INCLUDED among the provisions of the Finance Bill now before Congress is a proposal to levy a tax of ten per cent on the manufacturer's price of radio equipment. The object of this proposal, as is the case with all tax provisions, is to raise money for the support of the government. However, it is difficult to understand by what process of reasoning it was decided to select radio apparatus to bear this burden. Possibly this line is suffering on account of its position in the lime-light of public interest.

Primarily, this tax seems unjust. How, for example, is one to tell what is and what is not radio apparatus? A piece of wood, a bakelite panel, an insulator or a piece of wire constitute no part of radio until used in combination for that purpose. How, or when, then, is one to decide that any of these items is taxable? Endless confusion and dispute seem bound to ensue. Expensive collection and possible litigation loom conspicuously if this feature of the tax bill be enacted.

It would appear that entirely apart from the fact that an unfair burden will be placed on one of our newest industries, the revenue could better be raised by means of a retail sales tax or by including in the taxable items other lines of industry that are already firmly established and which, for that reason, would find the proposed levy less burdensome.

Hard Work Is Cure for Hard Times

THE "I told you so" gentry common to every class of business are raising a hue and cry regarding an impending business depression in certain Western states as a result of lack of rainfall, the epidemic of hoof and mouth disease in California and the fact that this is a presidential year. On the face of things, there is no cause for fear or hysteria. An excellent analysis of the situation is contained in the current issue of Pacific Business (San Francisco). This publication says:

"For the Pacific Slope: 'As a man thinketh in his heart so is he,' is applicable to the business man

of the Far West. He is optimistic and he is looking to the future with confidence. It follows, then, that despite unfavorable influences such as lagging lumber sales, the live stock epidemic, danger of drouth and disquieting political influences, business in this district continues remarkably good. Retail sales throughout the region are with few exceptions greater for March than for February even though somewhat less than a year ago, due in a measure, no doubt, to the lateness of Easter. Notwithstanding the handicap of dry weather Los Angeles sales were greater than March last year.

"The sanity with which business is being carried on indicates the strength of the immediate future. It is our belief from a survey of all factors that Pacific region business will be fair to good at least on through to summer, with a fresh spurt of activity later in the year. It is a good plan, however, to stay 'close to shore' as previously advised. Prices show little likelihood of strengthening unless there should come an unexpected foreign demand for goods."

"As a man thinketh in his heart so is he," aptly applies to the present situation. If you are inclined to be lazy, there is no better alibi than "depression" to explain lack of business. Depression is largely a state of mind. There is no better cure for hard times than hard work. If things look dull, take off your coat, roll up your sleeves and go after business.

Care Must Be Exercised in

Comparison of Electrical Equipment

SUGGESTIONS have been made by the electrical press from time to time that the industry co-operate with the home economy departments of some of the leading universities in making studies of the principal electrical household appliances. It was believed that tests could be made by unbiased agencies such as these which would prove the contentions of the industry regarding the advantages of electrical labor-saving equipment for the housewife. Such tests might then be quoted in sales promotion work.

A recent case of such a test has come to our attention in which an electric range was compared with other forms of cooking equipment to determine efficiency, cost of operation and other important factors. Due to unfamiliarity with the equipment several serious mistakes were made which resulted in an unfavorable comparison for the electric range. For instance, the range oven was allowed to operate at full heat throughout the test resulting in overheating. The oven door was opened at regular intervals to read thermometer temperatures while such readings were made through a glass aperture in the gas oven. Costs were computed on the basis of 9 cents per kw-hr. for electric energy, the lighting rate, instead of the cooking rate. Other serious mistakes were made, all of which contributed to the unfavorable impression regarding electric cookery.

This occurrence should prove a lesson to the industry. Luckily the results were not widely circulated but a wrong and probably lasting impression was formed in the minds of the many students in the class in which the test was made. If such compari-

sons are to be made in the future and if they are to have the effect desired, it will be well for the industry to see that they are properly supervised and that someone thoroughly familiar with the equipment to be tested is in charge.

Consider

the Goldfish

SPEAKING of privacy, there is something about the domestic menage of a goldfish that is singularly like that of a public utility. The domicile ordinarily occupied by a goldfish in captivity is a glass globe. It has no doors, no roof and no windows. Indeed the last would be a superfluity, for the goldfish globe of commerce is quite transparent. There is not even the saving grace of a shade of any sort. In short, the goldfish is a living breathing apotheosis of pitiless publicity. His daily peregrinations about his limited bailiwick are subject to scrutiny of the most intimate sort at any hour of the day or night, whenever the spectator, diverted for the moment by this glittering specimen of the finny tribe, should choose to dawdle about, manifesting an idle interest in its doings.

In this respect at least, the public utility is the goldfish of the industrial world. It is regulated by commissions, quite legally of course, that pry into its innermost affairs in a thoroughly ruthless way, and then, with glee and gusto spread the news abroad in the land for the edification of the proletarian readers of five-cent newspapers. In fact, through the development of the private-ownership commission-regulation idea, public utilities have practically ceased to function as private property; they have become metamorphosed by the evolution of events into public trusts, into the operation of which any citizen can pry to his heart's content by merely referring to the files and records of the regulatory commission.

It has been suggested, facetiously, that people who live in glass houses should pull down the blinds. The goldfish and the public utility, however, are not equipped with these modern conveniences. Both must, therefore, live their lives with the utmost circumspection, subject to the glare of the incandescents at all sorts of unsuspected moments. We would rather not be a goldfish.

Northwest Electric Range Survey

Deserves Support of Entire Industry

ALL branches of the electrical industry should be interested in the electric range survey which the range committee of the National Electric Light Association is sponsoring in Spokane, Wash. The committee is performing for the industry a service for which there has been a long-felt want. On another page of this issue its plans are outlined and some of the results which it hopes to achieve are set down. The work of the committee should receive the hearty support of every man in the industry and efforts should be put forth to see that the funds required for conducting the survey are placed at the immediate disposal of the men in charge.

DISCUSSION



Takes Exception to Statements Regarding Los Angeles Municipal System

To the Editor:

Sir: Enclosed herewith is a criticism of Frank G. Tyrrell's address before the San Francisco Electrical Development League and which was published in the last issue of the Journal of Electricity. The enclosed data will indicate the utter unreliability of Mr. Tyrrell's statements.

Figures are being used with the intention of conveying the impression that the municipal Bureau of Power and Light is woefully mismanaged. Mr. Frank G. Tyrrell, of Los Angeles, quotes to San Francisco audiences the Los Angeles Times, an avowed bitter enemy of the Los Angeles Bureau of Power and Light, as authority, which statements are repeated on every occasion by proponents of the great power corporation trust.

The organ of the Pacific Gas and Electric Company called "P. G. and E. Progress" prints the same figures and adds some of their own stating that "official figures are given as authority."

As in the majority of statements coming from such sources totally unrelated facts are grouped for comparison, but without disclosing the basis of figuring.

For the sake of clarity let us remember that prior to May 15, 1922, the Edison company retained possession and management of its electric distribution lines, which were afterwards purchased by Los Angeles, operating the system as agent for the city. It deducted all operating and certain other expenses, turning over the net balance to the City of Los Angeles. On May 15, 1922, the City of Los Angeles obtained physical possession of and operated the lines of the Edison company as well as the municipally-built system.

Figures usually quoted and referred to above, purport to show that after the city took over the Edison lines the number of employees increased in vastly greater proportion than the consolidated business justified and greater than when the Edison system was operated separately under the management of its officials.

The figures quoted are so far from any likelihood of truth that it is impossible to trace the origin or official authority. For instance, it is said that

"While the number of electric consumers on the lines of the Municipal Bureau of Power and Light has increased 45 per cent as a result of the city's purchase of the Los Angeles business of the Southern California Edison Company, the number of employees on the bureau's payroll has increased 275 per cent."

This quotation is as of December, 1923. The percentage increases are not and cannot have been figured on the same basis, because there are no facts to remotely suggest the percentages.

The facts are:

By December, 1923, compared with May, 1922, the number of meters on the combined system had increased 850 per cent over the original municipal system.

The distribution employees were increased 300 per cent to take care of this 850 per cent increase in meters or consumers.

The same unreliable authority states that the number of city distribution employees was (in December, 1923) 1,800.

The fact is that the average number of distribution employees on the payroll was 938 and these men were em-

ployed also in very extensive construction work entirely outside of and separate from operating and maintaining the system.

The surest and fairest gage of the efficiency of the Los Angeles Power Bureau may be found in the comparison of increased expenses with increased business.

Combining the number of meters, the gross revenue and maintenance and operation expense of the Edison System and the City System for the year 1921-1922 while operated as separate organizations, and comparing these data with the fiscal year 1922-1923 wherein there is a full year of operation of the consolidated systems under the management of the City of Los Angeles solely, we find by comparison—

Meters increased	17.1 per cent
Gross revenues increased.....	12.8 per cent
Maintenance and operation expenses, exclusive of taxes and purchased energy increased	11.3 per cent

but, upon taking over the Edison lines the city reduced rates amounting to \$600,000 for the year. Allowing for this we find the gross revenue increase to have been 21.5 per cent against the corresponding operation and maintenance expense of 11.3 per cent.

The above statement of facts from the official books ought to be sufficient to refute statements of this character, told and reiterated by the power corporations in official publications such as the "P. G. and E. Progress." The official audit of the books gives the plain truth.

There is one completely satisfying answer which will permit anyone, judicially minded, who desires the truth to form an intelligent judgment from an independent source of reliable information.

All persons, including power corporation officials, will agree that the rigid criterion of efficiency in the management and operation of large works is the financial yardstick.

The report of Price, Waterhouse & Company, an auditing firm of international reputation and standing, who audit the books of the Bureau of Power and Light, Department of Public Service, City of Los Angeles, shows that the revenues collected by the Municipal Power Bureau were \$7,763,000, and that this service was rendered at a cost of \$5,069,000, leaving a surplus or profit for the year of \$2,694,000.

These figures of Price, Waterhouse & Company, certified public accountants, are based upon a system of accounting paralleling that required by the State Railroad Commission of private electric utility corporations. The figures, therefore, may be used for comparison, notwithstanding the exceedingly low rates collected from consumers by the Los Angeles Bureau of Power and Light.

The audit shows that rates were above cost, the surplus being 35 per cent of the revenues; or, put another way, the surplus or profit was equal to 53 per cent of the cost of the service.

The combined effect of the very low rates charged by the Municipal Electric Power Bureau of Los Angeles and the highly economical operations of that bureau, has resulted in the cost of the service (\$5,069,000) being \$3,700,000 less than it would have cost consumers had the Pacific Gas and Electric Company delivered this same service to consumers, at that corporation's rate charged in San Francisco and Bay regions, and over \$4,800,000 less than the Southern California Edison consumers would have paid for the same service at rates charged in Long Beach, or other points outside of Los Angeles.

The balance sheet of this audit of Price, Waterhouse & Company furnishes another basis of comparison. The balance sheet as of June 30, 1923, shows assets of \$35,000,000 with

liabilities practically \$25,000,000, and, therefore, leaving an equity of closely \$10,000,000. The report further discloses that of this equity, \$6,423,000 was derived from surplus or profits of the Power Bureau earned during its six years of operation.

The outstanding bonded indebtedness is a little over \$21,000,000, which very agreeably compares with assets. At the same time the regular yearly reduction in bonded debt suggests further increases in surpluses, or the opportunity for still lower rates for the future.

Some groups of citizens prefer to think in terms of "earnings on investments." The Municipal Corporation is not concerned with this question, as service is presumed to be rendered at cost.

If the rates charged are to, or do, yield a surplus or profit it is a matter of policy not affecting the cost of the service. Such surpluses, moreover, are put back into new property belonging to the people.

From the balance sheet of the report of Price, Waterhouse & Company, it may be assumed that the investment in operating and other physical property of the Bureau of Power and Light in the City of Los Angeles did not exceed \$33,000,000 for the year. From this it will be seen that the net profit or surplus of \$2,694,000 indicates net return after all interest has been paid on outstanding bonds of 8 per cent. Corporations, however, in figuring the rate of return do not deduct the interest on bonds. In this event the net return is around 11 per cent on the investment. On the other hand, deducting from surplus an amount equivalent to taxes required of a corporation the rate of return would still be equivalent to over 9 per cent on the \$33,000,000 investment.

This rate of return is comparable with the electric utility figures as allowed by the Railroad Commission as one element in rate making.

Still another view of the financial situation may be deemed interesting.

It will be noted that the surplus of \$2,694,000 for the last fiscal year was obtained as a net after deducting the interest on the outstanding bonded debt. Hence, the surplus noted would under corporation practice, be available for the benefit of stockholders as owners of the \$10,000,000 unencumbered equity, which equity costs the taxpayers only \$3,553,000 as the report of Price, Waterhouse & Company shows.

Again, assuming that the City of Los Angeles paid taxes as a private corporation does, such items would be deducted from surplus, leaving the balance as the earning for the benefit of the equity in the property, and yielding a 20 per cent return to stockholders.

These results were obtained from rates to consumers lower than anywhere else in California where served by private utility corporations.

How can this claim of the propagandists of the private power companies be justified when it is shown that by the audit for the fiscal year ending June 30, 1922, a period when the Edison company operated its lines and the City of Los Angeles operated its own municipal lines, each by separate organization employees, as compared with the following year when the city operated the consolidated lines and business itself that the surplus allowing for a reduction of \$600,000 in rates was \$1,350,000 greater than the year before. This showing was in spite of the extraordinary extra expense incident to co-ordinating, consolidating and absorbing two separate systems throughout a great city. This extra expense fully offset the increase in revenues.

The officials of private power corporations may argue that the municipal Power Bureau of the City of Los Angeles is inefficient and mismanaged because they say, among other things, there is a larger number of employees per consumer than the system used to require when under private management; but, even if such charges were true (which they are not), the fact cannot be escaped that no private corporation in California, large or small, approximates the handsome financial showing of the Bureau of Power and Light as disclosed and proved by the audit of Price, Waterhouse & Company.

It is gratifying as well as a comforting thing to the people of Los Angeles that the figures given above by Price, Waterhouse & Company and by the Bureau of Power and Light are facts, undisputed and incontrovertible.

FRANKLIN HICHBORN,
State Campaign Committee,
California Water and Power Act.

San Francisco, Calif.
May 4, 1924.

EDITOR'S NOTE:—

Regarding the above statements we have the same old problem. Politically owned utilities conduct their affairs secretly. They then make carefully edited statements regarding them which, while known to be misleading, can only be answered by a general denial.

The Price-Waterhouse audit is presented as if this audit tells the public what a private investor would be entitled to know about the financial conditions of his company. Nevertheless, statements and rumors concerning unpaid (and unpayable) Power Bureau obligations, running into millions, have been current in Los Angeles for months. Even city councilmen have found it impossible to learn what this amount really is.

It is an astounding fact that this Price-Waterhouse "audit" does not answer the simple question, "What do you owe?"

The statements about the number of employees on the city distributing system purchased from the Edison company, before and after acquisition by the city, do not agree with the best information that outsiders are able to get. The letter speaks of an "increase" of 850 per cent in city meters. This, of course, was mainly the result of the purchase of the Edison city business. The real point is—did the number of employees on that system increase under municipal operation from one employee to 244 consumers, to one employee for 95 consumers? Our information is that this was the case.

Rates

Statements are made regarding low city rates in Los Angeles. The last Edison domestic rate in Los Angeles was 5½ cents per kilowatt-hour. Under the operating agreement the city increased this to 6.2 cents, and took the increase. On taking title, the city reduced the rate nearly (but not quite) to the former Edison rate. If Edison company had kept the system and the Railroad Commission had made the same proportional reduction in the city as elsewhere on the Edison system, the city domestic rate would now be 5.1 cents against the 5.6 cents now charged on the city tax-free system. Taking off from this rate merely the state and federal taxes (10 per cent) would make this comparison 4.6 to 5.6. That is only the lesser part of the tax burden. The general manager of Edison company is on record as saying that if free of income tax on stock and bond interest, as well as from property and business taxes on the system, all rates could be cut 25 per cent without its costing stockholders a penny. This makes the reasonable comparison 3.83 cents for a tax-free company service in Los Angeles against 5.6 cents for the tax-free city service now being supplied. If the city's "saving" of taxes made any reduction in the cost of government, it might amount to something; but as it is, the public merely pays the same sum out of another pocket.

The Journal of Electricity has already published census figures of cost of government per capita in the United States. The highest cost of all was Detroit, next Seattle, and next Los Angeles—the three political ownership cities "par excellence."

The letter claims Bureau of Power and Light assets of \$35,000,000, "with liabilities practically \$25,000,000." It does not mention that the taxpayers have contributed nearly \$6,500,000 of this total, and that much of this contribution was made years ago. During all of the time since then Los

Angeles has been borrowing money, and, to get the taxpayers' actual contribution, interest on those tax payments of at least 4½ per cent would have to be added. In addition to that, all that the Bureau has been able to save in excess of gross receipts over operating expenses also went into construction.

The fact that Los Angeles Bureau of Power and Light is furnished with free water for its plants has often been commented upon. It has not been pointed out very strongly that of the actual cost of construction of the Los Angeles Aqueduct, purely as a means of transporting water, millions of dollars in excess of the actual necessary cost of a water conduit were expended in keeping the canal on a flat grade, so as to concentrate the fall of the water at points where power plants could be located close to the city. These extra millions, at least, which were spent for power and for nothing else, ought to be included in the power bill.

Taxes

A careful analysis of the matter of taxes which a private company would pay were it operating the Los Angeles system, reveals some interesting figures.

State, County and Municipal Taxes

No state, county or municipal taxes are paid on the municipal power system, and none are included in operating expenses. The amount of such taxes attributable to the year under review on the basis of taxes paid by private companies, which amount to 7½ per cent of gross receipts from operation for the preceding year, are as follows:

Gross receipts for year ending June 30, 1922.....	\$6,880,940.74
Taxes attributable to 1923—7½ %.....	516,070.55

Federal Taxes

The municipal power system is also exempt from payment of federal taxes. A private company would have paid during the year under review income tax and capital stock tax as follows:

Net income of Bureau of Power and Light for year ending June 30, 1923, as per Price, Waterhouse & Company's report—Exhibit II.....	\$2,693,623.34
Deduct: State taxes which would have been paid by a private company as shown above.....	516,070.55
Balance Taxable Income.....	\$2,177,552.79
Income Tax —12½ %.....	
Capital stock tax, estimated—1½ %.....	
Total 14%.....	\$304,857.39

Use of Aqueduct

No charge is made against the electric department for the use of water supplied from the aqueduct. The entire cost of construction of the aqueduct, as well as all charges for operation and maintenance, is charged against the water department. The electric department should be charged with an amount at least equivalent to the carrying charges and operating and maintenance expenses of a transmission line from the source of supply to the site of the power house. This is estimated as follows:

Investment	
Estimated cost of substations and switching stations	\$1,250,000
Estimated cost of double transmission line	4,000,000
Total.....	\$5,250,000
Carrying Charges	
Interest at 5%	\$262,500
Sinking Fund at 2½ %.....	131,250
Total Carrying Charges,	\$393,750

Operating Expenses, Maintenance and Depreciation

Operating Expenses estimated at 0.03c. per kw-hr. transmitted.....	\$78,195
Depreciation on Sinking Fund Basis.....	43,470

Total.....	\$121,665
Total amount chargeable to Electric Department for use of Aqueduct.....	\$515,415

The Bureau of Power and Light claims interest and sinking funds on power bonds is paid from earnings. Yet, in the much advertised statement of profits for the year ending June 30, 1923, interest is included for sinking funds on power bonds issued, as follows:

On \$ 3,500,000 1910 issue.....	\$100,000
On \$ 6,500,000 1914 issue.....	250,000
On \$13,500,000 1919 issue.....	337,500
Total.....	\$687,500

The Bureau of Power and Light claims to be charging low rates, yet an increase of 12½ per cent in the rates ordered by the City Council at the request of the Public Service Commission in October, 1920, is still in effect while rates of private companies have all been reduced by the Railroad Commission and all war increases eliminated. This 12½ per cent increase in rates was part of the total income collected by the Bureau of Power and Light for the year ending June 30, 1923, and was an overcharge to city consumers of \$862,511.88.

The Bureau of Power and Light purchases power at wholesale from Southern California Edison Company under a contract approved by the State Railroad Commission. Under the rates fixed by the Railroad Commission the city purchased this power during the year 1923 at a reduction of 29 per cent below the rate agreed to between the city and the company in the original contract. No part of this rate reduction has been allowed retail consumers of the Bureau of Power and Light even though the city's payment for purchased power was reduced \$593,691.90.

The rate charged the Bureau of Power and Light this year is still less. The Railroad Commission recently ordered a further reduction in this rate of 7½ per cent, saving the Bureau of Power and Light an additional \$109,306.23.

The total amount which should immediately have been allowed retail consumers on account of reductions made by the Railroad Commission in the wholesale rate is \$702,998.13.

To pay interest and sinking funds on power bonds previously issued the people have been taxed \$6,392,535.89. Instead of fulfilling their promises and paying this amount from earnings, the Bureau of Power and Light diverted the funds to pay for extensions to serve new customers from whom they are collecting their regular charges. The taxpayers are entitled to have all of this money returned to them and in the meantime the Bureau of Power and Light should be paying them interest at the rate of 6 per cent each year, or \$383,552.15.

The Bureau of Power and Light has now outstanding \$21,300,000 of power bonds which are exempt from all taxes and the federal government must collect an equivalent sum from farmers and the people at large to support the government. If these were private corporation bonds, the government would collect each year \$213,000.

Prior to the time the Power Bureau began operating its own plants electric service was furnished in Los Angeles by the power companies and

the maximum rate was 51½c. for each kilowatt-hour. This rate included taxes collected by the companies from consumers and paid to the state and federal governments, leaving the net rate obtained by the companies 5c.

The Power Bureau started in by furnishing a few scattered consumers at this 5c. rate because it was not obliged to pay any taxes. Later the municipal rates were increased 12½ per cent, making the lighting rate 5.6c., which is still in effect.

The Bureau of Power and Light includes no item in its reported expenses for the cost of bringing water through the aqueduct over two hundred miles from Owens River to the city power plants and using this water for the generation of power. All of the cost of the aqueduct is charged to the water department in spite of the fact that many millions of dollars extra were spent on the aqueduct that the water might be delivered to the power plant locations for the purpose of generating power. Because the city water department is unable to collect anything for this valuable service it has been compelled year after year to collect directly from the taxpayers a substantial part of the amount it must pay for interest and sinking fund on water bonds. During the year ended June 30, 1923, this amounted to \$1,098,450, which is just about one-half of the interest and sinking fund charges on water bonds.

The Bureau of Power and Light should pay its proper proportion of the annual amount of maintaining the aqueduct because all of the water is used in the power plants and without this water the power plants would be merely junk. If the power plants were located at the head works of the aqueduct instead of near the terminus, the Power Bureau would have to build a 240-mile steel tower transmission line to bring the power to Los Angeles. The aqueduct saves this expenditure and the Power Bureau should compensate the water department and relieve the taxpayers accordingly.

When the Bureau of Power and Light took over the Southern California Edison Company distributing system in the city the company was required to turn over to them the balance in the depreciation fund of \$749,367.94, accumulated during the period the company system was operated for the benefit of the city under the much discussed Operating Agreement. The Bureau of Power and Light did not credit this to depreciation fund to be spent for replacements, but put the money in its general coffers and then complained that the Edison system was not up to standard. During the first year of operation the Bureau spent \$551,532.95 in strengthening the Edison system but instead of charging this against the money collected from the Edison company for this purpose they charged \$250,000 as an additional investment and \$301,532.95 against the Bureau's meager depreciation fund supposed to be held intact to make replacements to the generating plants.

Service to Other City Departments

When the Los Angeles distributing system was operated by Southern California Edison Company, the city hall, public libraries and other public buildings were furnished energy for lighting, etc., without charge. Since the taking over of the system by the Bureau of Power and Light, these other city departments have paid regular schedule rates for this service. While no figures are available as to the amount supplied during the year under review, this has amounted to a considerable sum.

In making comparisons of government-owned and operated utilities with those under private ownership and commission regulation, the question of taxation and the revenue therefrom are inseparably interwoven. That the cost of government must be met cannot be denied. Robbing Peter to pay Paul may bring about a "paper" showing for such an enterprise as the Los Angeles municipal power and light enterprise, but such accounting methods are a mere subterfuge. It simply brings about a disproportionate burden upon other sources of tax revenue in order that those in control may attempt to justify their representations of "large profits" to the voters who authorized the incurring of the indebtedness that made the enterprise possible.

Since such enterprises are subject to neither scrutiny nor regulation by such a body as the California State Railroad Commission, it is indeed difficult to ascertain what is being done; in fact such deductions as have been evolved from the comparatively meager data available would tend to show that more things are being done to the taxpayers than for the taxpayers.

It is at least interesting to note that, in spite of the fact that all the cost of bringing the water for power purposes to the generators of the city plant is paid by the Aqueduct and no taxes of any kind find their way into the general fund for defraying the cost of government, the rate charged by the city is appreciably higher than the last rate charged by the Edison company.

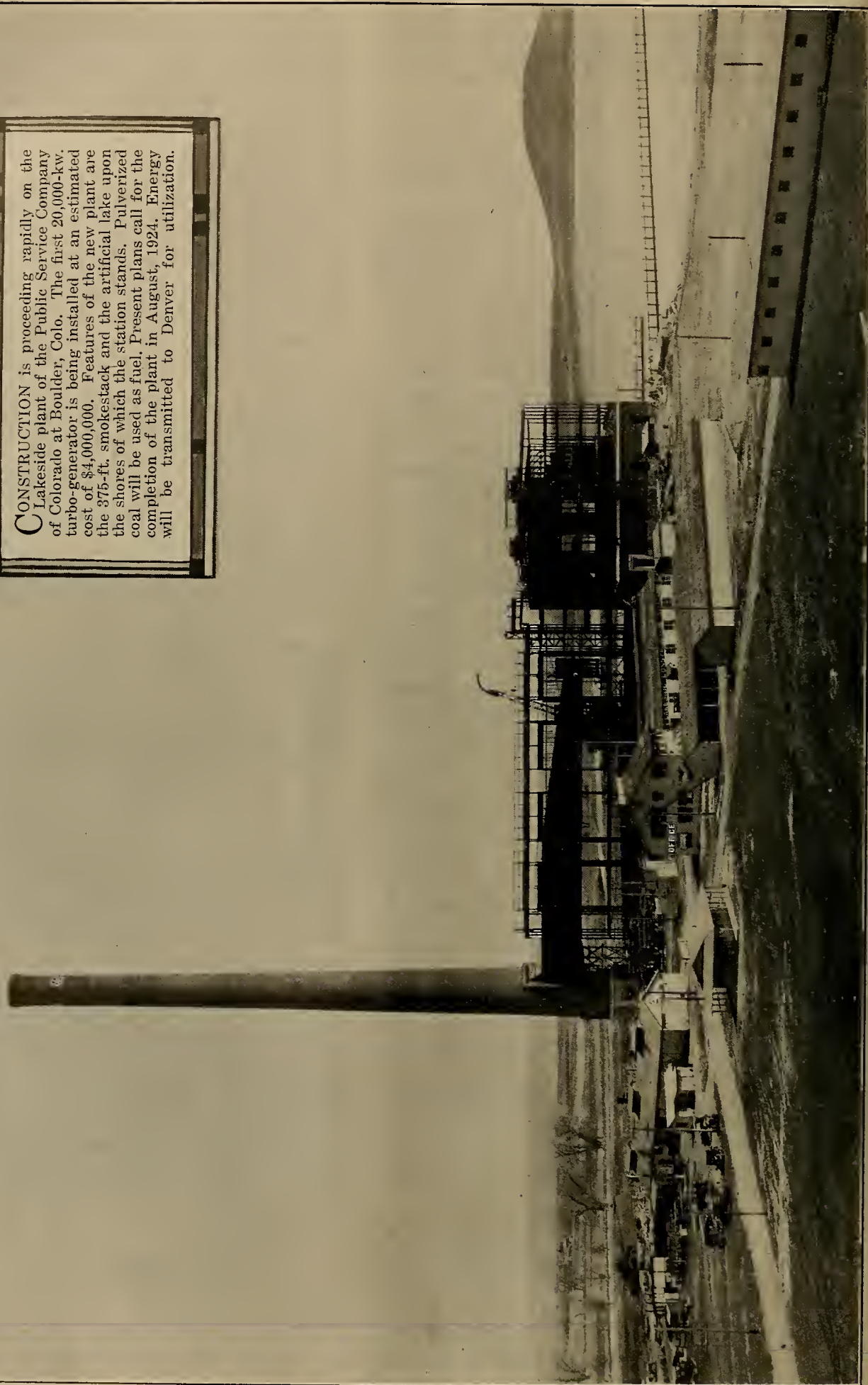
The question of tax-free bonds is beginning to receive attention from Congress; in fact it has been proposed to repeal the tax-free provision because of the loss of income to the government from men of large income, whose money seeks such investments rather than development enterprises. Thus it is that the man of moderate income rather than the very rich is carrying the expense of government through the institution of such enterprises as that of the Los Angeles Bureau of Power and Light which, under the cloak of swatting the wicked power trust and preserving the water and power resources for the benefit of the people, actually, through the creation of additional tax-free securities, imposes a greater and greater burden on the remaining sources of tax revenue in order to make up the deficit created by the loss of tax income formerly paid into the public treasury by the power companies.

The government ownership and operation of all sorts of things and the promise of operation without profit for the benefit of all the people has a dulcet sound in many ears. It must not be forgotten, however, that profits mean efficiency, and that efficiency and government ownership have not yet shown any signs of going into partnership. Modern business insists upon efficiency, and it hires and fires until it is brought about. Modern politics unfortunately is based upon totally different standards, and the interjection of politics into business inevitably means slack methods, little if any discipline and inability to fix responsibility.

We welcome the expression of views contrary to our own, but we cannot see anything in Mr. Hichborn's statement that in any way strengthens the case for the Los Angeles Bureau of Power and Light, or for the cause of government ownership and operation of public utilities in general.

THE EDITORS.

CONSTRUCTION is proceeding rapidly on the Lakeside plant of the Public Service Company of Colorado at Boulder, Colo. The first 20,000-kw. turbo-generator is being installed at an estimated cost of \$4,000,000. Features of the new plant are the 375-ft. smokestack and the artificial lake upon the shores of which the station stands. Pulverized coal will be used as fuel. Present plans call for the completion of the plant in August, 1924. Energy will be transmitted to Denver for utilization.



The Interdependence of Irrigation and Hydroelectric Power

By John D. Galloway

Consulting Engineer, San Francisco, Calif.

IN connection with several discussions of the development of hydroelectric power the writer has had occasion to refer to the intimate relation that exists between that industry and irrigation. The prevalent idea is that there is an irreconcilable conflict between power and irrigation when it comes to the use of the waters of any one stream. This belief is entirely incorrect, as there is, on the contrary, an interdependence between the two uses of water that can be used for mutual benefit, especially that of irrigation. Any stream, when properly developed, can be made to furnish a maximum of power and a maximum of water for irrigation and the works of one can be so designed that they will serve the uses of the other with a resulting minimum of cost.

The impression that the two uses of water are in conflict has arisen, in California at least, largely from the fact that in the evolution of the arts of power and irrigation, two different agencies of the state have been employed: power by private corporations and irrigation by municipal corporations. Due to the usual shortsightedness of humanity, assisted by demagogues and politicians, who fish in troubled waters for their own benefit, this idea of conflict is deep-seated. When, however, the subject is treated as an engineering problem, the apparent conflict disappears and a mutuality of interest is shown to exist.

It is recognized that each river is a problem by itself, the solution of which depends upon its physical characteristics. The various items of watershed, precipitation, seasons, storage sites, tributary land areas, etc., must be taken into account and a study made in detail before a correct conclusion can be reached. The subject is only treated in a general way herein. Illustrations are drawn from California streams because in that state there has been the greatest development, both of power and irrigation, of any in the country. The difference in the agencies employed to construct the works is of no importance except that power developed as an adjunct of irrigation works may be disposed of to private corporations.

THE prevalent idea that there must always be conflict between the uses of water for irrigation and water for power is a popular fancy, fanned by demagogues and politicians who seek personal aggrandizement and popularity. From an engineering standpoint the two are closely related. Instead of conflict between these two major demands for water, there is a mutual interdependence between the two, for their interests are identical.

Before showing the relationship between the two uses of the water, it is in order to set forth the limitations that govern the use of water for power and water for irrigation. Unless these are understood, no appreciation can be had of the relationship between the two. It is unnecessary to mention more than the mutual dependence upon each other, of the city and country, of the urban and suburban areas where power is most used and where the products of agriculture are mostly consumed, and of the country, where water is used and where manufactured articles from the cities are required. In a way, modern life is based upon power, and in the West hydroelectric power is of supreme importance, both in city and country. In the modern scheme of things, it is of equal importance to generate power and to raise food.

Characteristics of Power Systems

As in all other phases of industry the use of power is not uniform but varies with the day and with the season. A mathematical average of the power demand may be obtained and the relation of this average demand to the maximum or peak demand is expressed as a percentage—the daily or annual load factor. With the daily fluctuation of power demand this discussion is not concerned, except to note that by the use of steam reserve power plants at the receiving end of long transmission lines to carry some of the peak loads, the daily load factor on hydroelectric plants may be raised above the system load factor, up to 75 or 85 per cent in California.

The changes in energy demand over a calendar year is of extreme importance in the relation of power to irrigation; first in relation to the amount of water discharged from power reservoirs and second, in the ability of power systems to consume the energy from a power plant taking water from a reservoir, the primary use of which is for irrigation and the delivery of which corresponds to the irrigation demand.

The characteristics of power systems as regards the demand in the several months of the year for

energy differ widely. The accompanying table shows the annual variation in energy output by months expressed as the average daily output for each month and the percentage of the annual mean, of five large power systems in the Pacific States.

These data are for the year 1921 as representing most closely the annual variation, undisturbed by

naturally desire to pour a large amount of water on their lands during the time of spring floods. Hence in May and June the demand for water is greatest. With the presence of ample water in a storage reservoir, to be used when required, it is probable that the demand will be lessened in the months of maximum demand. The recently completed Don Pedro

TABLE I—DAILY AVERAGE ENERGY OUTPUT, IN KILOWATT HOURS, AND PERCENTAGE OF ANNUAL MEAN.

Month.	WASHINGTON WATER POWER COMPANY.		PUGET SOUND POWER AND LIGHT COMPANY.		PACIFIC GAS AND ELECTRIC COMPANY.		SAN JOAQUIN LIGHT AND POWER COMPANY.		SOUTHERN CALIFORNIA EDISON COMPANY.	
	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.	Daily average, in kilowatt-hours.	Per-centage.
January.....	984 430	96.0	1 196 330	104.1	3 964 000	97.2	778 960	71.8	2 297 360	78.5
February.....	969 590	94.5	1 177 020	102.4	3 857 000	94.5	765 100	70.5	2 052 010	70.0
March.....	977 190	95.3	1 182 710	103.1	3 806 000	93.4	821 800	76.8	2 464 890	84.3
April.....	925 190	90.3	1 137 340	99.0	3 937 000	96.5	1 213 120	112.0	3 085 780	105.3
May.....	879 980	85.8	1 041 040	90.8	4 290 000	105.0	1 172 890	108.1	2 865 560	98.0
June.....	973 700	94.9	1 064 120	92.7	4 430 000	108.5	1 258 130	116.0	3 309 960	113.0
July.....	1 011 440	98.7	1 007 350	87.7	4 284 000	104.9	1 369 600	126.0	3 575 340	122.0
August.....	1 112 690	108.6	1 078 000	93.9	4 277 000	104.8	1 360 160	125.2	3 548 890	121.0
September.....	1 076 040	104.9	1 159 530	101.0	4 133 000	101.2	1 193 580	110.0	3 428 730	117.0
October.....	1 127 680	109.9	1 186 970	103.2	4 048 000	99.2	1 035 560	95.5	2 855 020	97.5
November.....	1 155 080	112.7	1 274 420	111.0	3 973 000	97.4	1 051 630	97.0	2 911 240	99.5
December.....	1 110 430	108.2	1 277 890	111.2	3 974 000	97.4	984 940	90.8	2 744 340	93.8
Mean.....	1 025 690	100.0	1 148 490	100.0	4 081 000	100.0	1 085 410	100.0	2 932 630	100.0
Annual load factor.....	61%		48.8%		63.6%		52.9%		64%	

increases in demand. The same data are expressed in Fig. 1.

On examination of these data it is shown that all systems have a demand for a block of energy during the summer months in excess of the average. Two California systems illustrate the extremes. The Pacific Gas and Electric Company ranges from a minimum of 93.4 per cent of the average in March to a maximum of 108.5 per cent in June, a range of 15.1 per cent. The San Joaquin Light & Power Corporation varies from 70.5 per cent of the average in February to 126.0 per cent in July, a range of 55.5 per cent. In the case of the latter company the greater range is caused by the agricultural country it serves, irrigation pumping in summer forming a large element in its power demand.

As will be shown later, the summer hump in the energy demand curve occurs at a time when the streams have fallen towards the low water period and as a result, water must be released from storage reservoirs to supply the deficiency.

Characteristics of Irrigation Systems

In the same manner as for power systems, the summer season brings a great demand for irrigation water, much of which must come from storage reservoirs, if supplied. The demand for water varies in different localities, due to varying amounts of rainfall, character of crops, duty of water and other similar elements. The presence or absence of storage reservoirs has something to do with the time when water is used and the amount. And yet, in California, no streams have been provided with adequate storage reservoirs, either for irrigation or power. In the absence of a storage reservoir the farmers

reservoir may have such an effect in the Turlock and Modesto districts.

The variation in demand for irrigation water may be expressed by monthly percentages of the total amount used annually. An example is found in the following table, prepared for a region in northern California.

Table 2
Variation in Irrigation Demand

Month	% of Yearly Total
January.....	0
February.....	0
March.....	3
April.....	7
May.....	16
June.....	22
July.....	21
August.....	19
September.....	11
October.....	1
November.....	0
December.....	0
Year	100

These percentages will vary in different localities and in some cases, irrigation will extend into other months. However, the bulk of water will always be used in May, June, July and August and as in the case of power, storage reservoirs must be provided if the river is completely developed.

Characteristics of California Rivers

All streams vary in flow with the seasons but in California the variations are more marked than elsewhere. Many streams have a low water flow of only

two to five per cent of the maximum. Again the range in discharge from year to year varies. Some northern rivers range from one-half to twice the mean and southern rivers exceed this variation.

The usual California river coming from the high mountains has two types of floods. A winter flood may be caused by excessive rains in the foothill region—up to elevation 3,000 ft. Spring floods usually come from melting snows or a combination of rain and melting snow above elevation 3,000 ft. As a rule, the spring floods upon which irrigation depends, come from melting snow. These floods are not all at the same time. Due to greater elevation of the mountains, the southern rivers, San Joaquin, Kings, Kaweah and Kern have floods a month or so later than northern rivers, Sacramento, Feather, Yuba, etc. For irrigation the southern rivers are best, but in all of them the natural flow falls away

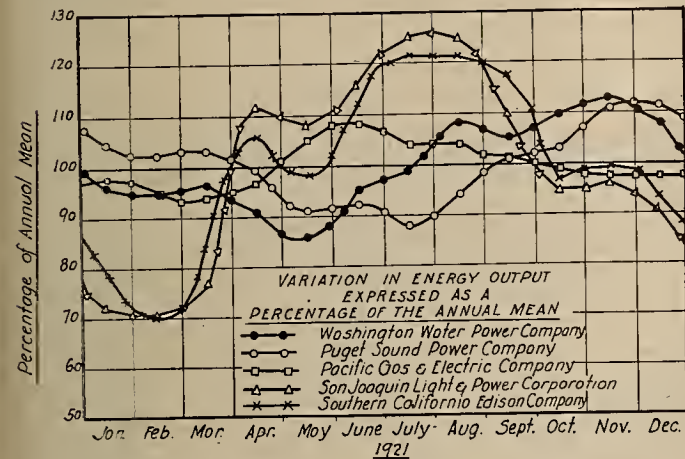


Fig. 1—Annual variation of energy output by months.

just as the greatest demand comes on—June, July and August. Hence the need of storage reservoirs.

In the study of any river for a reasonably complete development it at once becomes apparent that all the water that flows cannot be used. Storage sites do not exist nor would the expense be warranted to construct reservoirs to fully regulate the stream at all times. There are a few exceptions to this. Probably the best site for fully regulating a part of the stream is at Lake Almanor on the North Fork of the Feather River, where a reservoir site exists of 1,250,000 acre-ft. capacity that will fully conserve all water coming from about 500 sq. mi. of watershed. The general statement is true, however. It follows that in an engineering study of any river there must be taken into account a large number of factors, such as minimum and maximum stream discharge; area of land available for irrigation; size, location and cost of storage sites and the several requirements of irrigation. No stream would be developed merely for the extreme minimum discharge nor for the maximum. Probably the mean discharge is a fair statement of the amount that might be used. The power study would follow similar lines but the presence or absence of good storage sites is a large element in determining the maximum power development.

Principles of Development

It is necessary to emphasize certain basic principles for the two forms of development in order to ascertain the relation between the two.

Power

(a) Power reservoirs must be built well up to the summit of the mountains to obtain the most energy, but with sufficient watershed to fill them.

(b) Unit reservoir costs can be higher than for irrigation due to greater sale value of products.

(c) Water must be discharged at a fairly uniform rate throughout the low water period and into the winter months when streams are often low, due to freezing of sources of water.

Irrigation

(a) Irrigation reservoirs should be built in the lower foothills and on the main stream if possible.

(b) Favorable sites usually exist for such reservoirs and due to a number of causes, the cost is much less than for higher reservoirs.

(c) Water must be discharged at rates that vary widely at different times. After irrigation ceases, the gates should be closed in order to store water for next year.

(d) A power plant can usually be built at the dam of the irrigation reservoir, and energy therefrom sold at rates that will yield a substantial profit.

Proper Reservoir Sites Essential

These points need to be amplified, as the subject does not seem clear at all times. It is a rare case where reservoir sites exist in the high mountains, the development cost of which is less than an equivalent reservoir lower down. The contrary is the general rule. Again no irrigation reservoir should be built that depends upon melting snow to fill it. The snow is a storage of water and its time of melting coincides with the time of greatest irrigation demand. The irrigation reservoir should be located in the lower foothills just above the canal system so that it will fill from the runoff resulting from winter rains in the foothills, or from water discharged from power reservoirs during winter low water.

Since the irrigation reservoir must store at best only about one-third of the water passing it and diverted lower down for irrigation in any one year, the storage capacity at a given site is determined by the demand and obtained by placing the crest of the dam at proper elevation. Reservoir sites of the proper type exist on the Stanislaus at Melones; on the Tuolumne at Don Pedro; on the Merced at Exchequer; on the San Joaquin at Millerton and on the Kings at Pine Flat. Others can be obtained on the other rivers.

Economic Development of Rivers

Having in view the proper relations between power and irrigation, and having set forth the characteristics of the three variables, power demand, irrigation demand and the river, together with cer-

tain principles of reservoir construction, it is in order to show how the three can be made to work together to the best economic development. There is given in Fig. 2 a diagrammatic representation based on actual quantities of the three variable factors concerned.

One irregular line represents the hydrograph of the stream, variable year by year, but generally of this form although displaced laterally by years and by location. The typical power demand curve is that for northern California. The irrigation demand curve is based on the percentages given in Table 2. The curves are diagrammatic but represent possible conditions.

The diagram is interpreted as follows: From January up to about April 20 the natural flow of the stream is sufficient for both purposes. On that date,

reservoirs above the irrigation reservoir. The size of the irrigation reservoir can be materially decreased with resulting saving in cost over that necessary if power storage is not present. The second benefit, which is much greater, is that the water stored for power in one year is carried over to the next year for irrigation and thus makes more certain the filling of the irrigation reservoir. This present season, one of the most deficient in precipitation in the history of the state, illustrates the point made.

On the San Joaquin, had the Millerton reservoir been in existence, it would have been receiving water from the storage reservoirs of the two power companies above. On the Feather, many thousand acre-feet of stored water have been discharged from Lake Almanor for power since the irrigation season of last year closed and practically all this water has

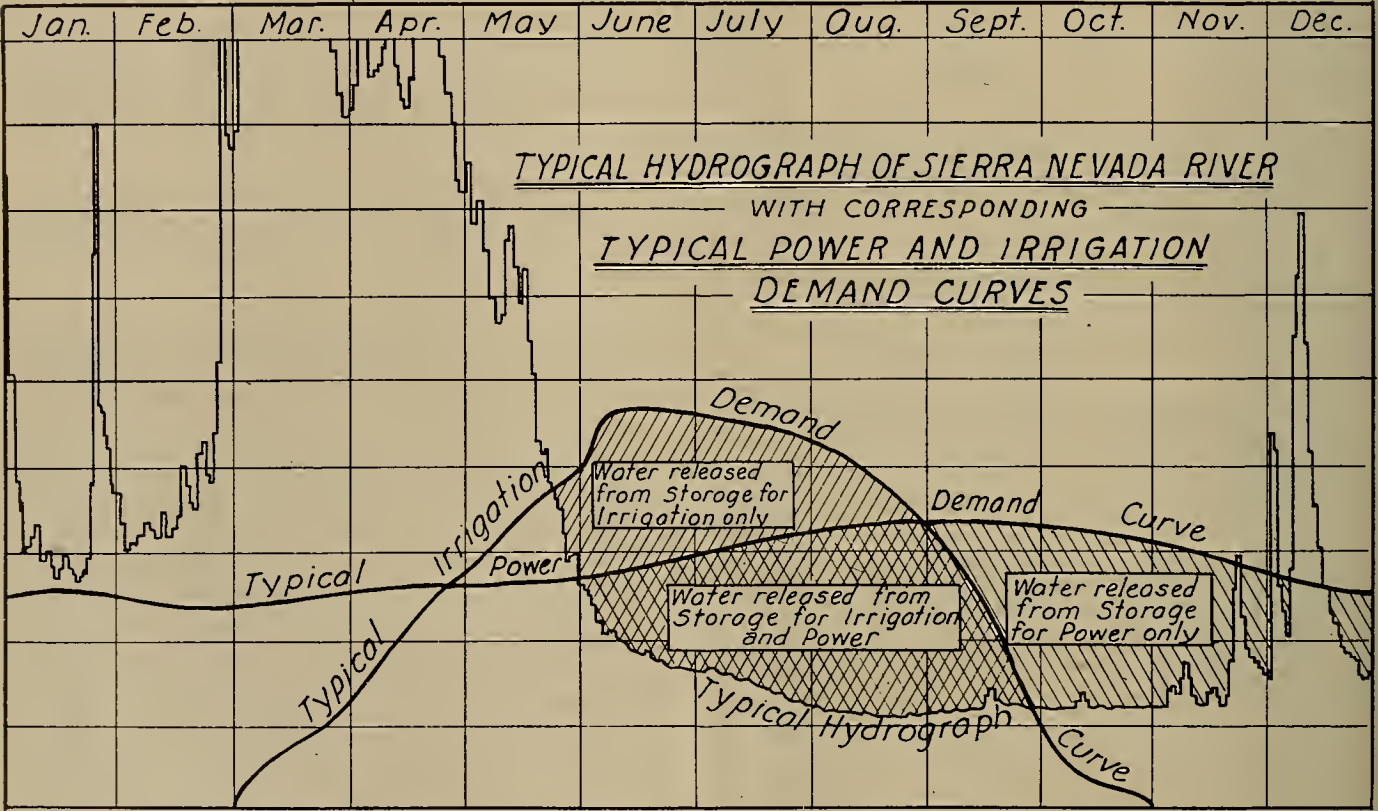


Fig. 2—Diagrammatic representation of stream flow, irrigation and power demand.

to satisfy the rising demand for irrigation water coming when the stream is falling, water is released from the irrigation reservoir. On June 1, water is first sent down from the power reservoirs. About July 1 the water from power reservoirs equals that being drawn from the irrigation reservoir. On September 1 power demand is equal to irrigation demand for water and draft on irrigation reservoir ceases, all irrigation demands being supplied by natural flow and water from power reservoirs. From this time on, and especially after irrigation ceases, the water drawn from power reservoirs is caught in the irrigation reservoirs and held over until the following season.

It will be recognized that two direct benefits to irrigation follow from the construction of power

run into the sea. Had there been an irrigating reservoir of proper size on the lower river, it would have retained this water, originating in the snows of a former winter, for irrigation during this very dry year.

The plan proposed is one for the regulation of a stream over at least two years. It is the only economic way of treating a stream discharge and it illustrates that instead of there being a conflict between the two major demands for water, there is a mutual interdependence between the two because their interests are identical.

As stated in the beginning, each river is a problem by itself, limited by its special physical features and its surroundings, but to which the general plan of development herein outlined is applicable.

How Shall the Electric Range be Sold, Served and Installed?

FORWARD looking central stations have, for a number of years, realized that the electric range possesses great potential possibilities for increasing the residential load. Many have gone ahead and developed this business, believing that anything that tended to increase the use of electricity in the home would, in the final analysis, work out to the benefit of both the customer and the

company. In virtually all such cases companies have installed electric ranges in customers' homes without any advance planning for the increase in the capacity of the distribution system. When the local demand grew to a point where voltage regulation was affected, additional transformer capacity was installed and secondary wires were increased in size.

To obtain this business, in competition with other fuels, an energy rate low enough to attract customers was offered; but, in reality, little was known as to whether or not the rates were adequate to cover the cost of service. Those companies which have sold ranges to their customers believe that the business is profitable and should be encouraged. They have, however, had to solve many perplexing problems in the most expedient manner as they arose.

On the other hand there are many central station men who, because of the unknown factors, have held off and to some extent discouraged the installation of electric ranges on the lines of their company. This situation is due entirely to the lack of definite information concerning the characteristics of the electric range load.

Whether or not the electric range has, up to the present time, made a profitable load for the central station company, the fact remains that these companies are confronted by a growing public demand for the electric range. The public will be served in this respect, and the question that remains to be answered by the central station company now, is whether or not it will continue to serve this business on a more or less hit-and-miss basis, or whether it will take the necessary steps to acquire reliable information about the business, so that it can be handled intelligently and at an ultimate profit.

In the electric range survey, which the Range Committee of the National Electric Light Association has undertaken in Spokane, Washington, a practical method has been devised for obtaining all of the essential information concerning energy consumption, kilowatt demand, load factor, diversity

AT its convention last year, the Northwest Electric Light and Power Association recommended that a detailed investigation of range load characteristics be made so that a sound policy of service might be worked out by central stations. Such a survey is now under way in Spokane. This article sets down some of the results which the committee hopes to achieve and the methods to be followed in reaching them.

factor, demand factor, etc. With this data at hand it will then be possible to analyze the electric range load for the purpose of determining what effect the addition of a range to a central station system will mean in ultimate capital investment and what rate for this service will be compensatory as the load grows. It is of first importance that the central station company should be able to strike a

balance between the growing public desire to cook electrically, and the central station company's right to supply its service at a commensurate profit.

In Spokane, Wash., the Range Committee of the National Electric Light Association has selected a typical residential district for an intensive survey of the different factors involved in serving this load. This district embraces 316 customers, of whom 150 are using electric ranges. The plans of the committee contemplate the most complete and practical investigation of the characteristics of the electric range load ever undertaken in the electrical industry. While a report of the progress made thus far will be presented in detail at the Atlantic City convention, the purpose of the survey is of such vital importance to central station executives, engineers and commercial men that they should give it serious consideration. The plan as mapped out is of particular value in that definite methods have been set up whereby the problems of installation, service, maintenance and sale of electric ranges can be intelligently studied.

The actual work of collecting the data which has already been started in Spokane is the crystallization of the effort of many commercial men and the direct result of the commercial section of the Northwest Electric Light and Power Association, working in conjunction with the Range Committee of the National Association. For some years central station men have been endeavoring to obtain by individual effort more definite information concerning the electric range load. In the states of Oregon, Washington, Idaho, Utah and Montana, there are in service at this time approximately 40,000 electric ranges. Several of the utility companies have considerably more than 5,000 ranges on their respective systems and the number is growing rapidly. There are some small towns in which there is a range in every other residence. Thus it will be seen that electric cookery is not only practical, but there is also a very insistent demand in the mind of the public for this service.

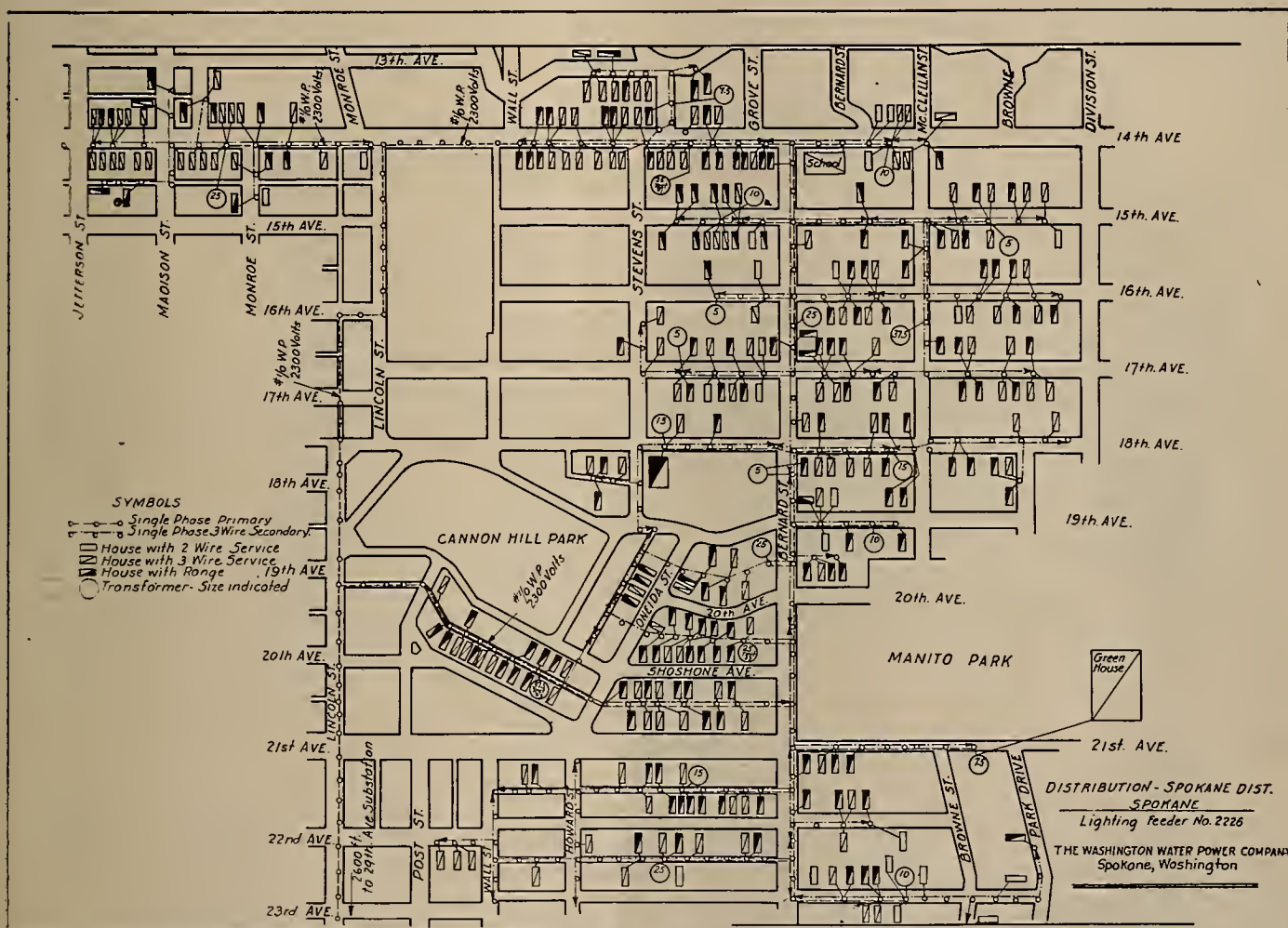


A typical urban residential district has been chosen for the Spokane electric range survey. The accompanying pictures show some of the residences in the district as well as one of the streets. To the right is the interior of the kitchen in one of the homes. Of the 316 homes supplied by a single feeder 150 have electric ranges. The average connected load per consumer is 7.3 kw.



That electric ranges can be sold in quantities at rately metered circuits and services extending over present prices has been amply demonstrated in the a period of at least one year. results accomplished by the utilities in the North- With these preliminary arrangements completed, the committee is in a position to go ahead with the view to selecting the most typical section and obtain accurate information on energy consumed, in which to conduct a field survey, the residential demand, demand and diversity factors of the range district in Spokane has been chosen.

How well this particular district is suited for transmission and distribution systems is necessary such an investigation may be seen by the accom- when the load reaches different saturation points, panying map, showing the location of residence serv- such as one range to every ten customers, one range ices in an area supplied by one lighting feeder. to every four customers, one range to every two cus- In this section there are 316 residential customers tomers and so on. The cost of getting such data in and 150 of them, well distributed throughout the really reliable form will of course be considerable and



A map of the residential district in Spokane where the present survey is being made showing the location of homes containing electric ranges, the feeder serving the district and the various transformers. There are 316 residences and 150 electric ranges.

area, are using electric ranges. The entire district is supplied from a single feeder with the transformer and range service locations indicated on the map. The photographs taken of the streets in this section show the type of residences served.

The Range Committee has already sent out a questionnaire to each of the residential customers in the district from which complete information on the total connected appliance and lighting load of each residence has been compiled. A summary of this information is shown in the accompanying tabulation. From this point the Range Committee purposes to carry on its investigation by means of sepa-

the committee has outlined four different methods varying in cost which will be submitted to the executive committee of the National Association with the request that it approve and make available the fund necessary to carry out the survey under the methods that will develop the greatest amount of useful data.

Method of Making Survey

1. Approximate method. This provides for a comparatively simple study of a large number of range customers. Graphic demand or wattmeters to be installed at a substation and all transformer locations supplemented with readings of the customers' meters over a period of one week will give

data from which approximate information can be obtained. The cost of this and the three other methods is estimated on the basis of the feeder shown on the map. The installation and expense, freight and traveling expenses are figured on the basis of 20 set-ups. Salaries for engineer and assistant cover a period of a year.

20 Westinghouse Type R.A. demand meters.....	\$ 2,400
40 Current transformers	1,000
20 Cabinets equipped for pole mounting.....	200
Installation expense	4,000
Freight and traveling expense.....	2,000
Engineer and assistant.....	5,400
Total.....	15,000
Less salvage on meters which it is proposed the member companies take off our hands.....	2,000
Net cost	\$13,000

3. Distant Dial Method. This provides for a standard Sangamo watt-hour meter equipped with a special contact-making device in the register which by sending impulses over a low voltage pressure circuit will register the summation readings of a group of ten watt-hour meters on one meter dial located at a distance. By equipping this distant dial with a standard General Electric printometer and plotting the differences indicated by this printometer a load curve can be obtained which would be a curve of the aggregate demand of the group of ten installations. By the use of a Warren motor drive it would be possible to synchronize the operations of any number of different printometers so that simultaneous records could be obtained on any number of groups of 10 installations actuated by the distant dial method and thereby a load curve obtained showing

CONNECTED LOAD SURVEY, 314 CONSUMERS

Appliance	Total Number	Number per Consumer	Total Kw. Connected Load	Watts Connected Load per Consumer
Electric Range	159	.507	1,130.00	3,600
Water Heater	149	.475	120.00	382
Flat Iron	322	1.02	193.00	614
Vacuum Cleaner	256	.815	45.00	143
Curling Iron	156	.497	2.35	7.5
Washing Machine	153	.488	30.70	98
Toaster	171	.545	85.50	272
Percolator	140	.447	56.10	178
Waffle Iron	92	.294	55.00	175
Air Heater	73	.233	44.00	140
Sewing Machine	69	.220	6.90	22
Grill	61	.195	36.90	117
Heating Pad	42	.134	2.10	6.7
Hot Plate	31	.099	31.20	99
Vibrator	28	.089	2.80	8.9
Chafing Dish	9	.029	2.70	8.6
Ironing Machine	6	.019	9.00	28
Immersion Heater	7	.022	3.50	11
Miscellaneous	22	.070	5.75	18.3
Total	1,946	6.2	1,862.5	5,930
Total exclusive of Ranges and Water Heaters	1,638	5.2	612.5	1,948
Lamp Sockets	8,640	27.4	432.0	1,370
Grand Total			2,294.5	7,300
Rooms	Total Number 2,440	Number per House 7.75		
People	1,210	3.86		
Maids	75	.24		

2. Duplicate Secondary Bus Method. This provides for the installation of a duplicate circuit on each transformer secondary where survey is to be made. Recording demand meters are to be placed on this bus at the transformer and data obtained similar to the approximate method. Each range customer will be provided with a duplicate service loop since the lighting and range services are on the same set of service wires. The cost is as follows:

20 Westinghouse Type R.A. demand meters.....	\$ 2,400
40 Current transformers	1,000
20 Cabinets equipped for pole mounting.....	200
550 cwt. copper wire, 5 set-ups.....	8,000
Miscellaneous material, 5 set-ups.....	500
Installation expense (meters).....	4,000
“ “ (wires)	1,000
Freight and traveling expense.....	2,000
Engineer and assistant.....	5,400
Total.....	\$24,500
Less salvage on meters which it is proposed the member companies take off our hands.....	4,500
Net cost	\$20,000

the aggregate demand of any number of installations. Under this method the cost will be:

150—15-ampere, 3-wire Sangamo watt-hour meters equipped with contact making devices and installed on range circuits	\$ 3,250
15 G.E. Co. printometers with Warren motor drive and contact devices installed.....	2,625
15 Sangamo distant dial installed.....	400
1—1-hp. a.c. d.c. motor generator set or storage battery for energizing control circuit.....	150
150,000 ft. of telephone duplex pair control circuit installed, 5 set-ups	3,000
150 homes wired in with standard telephone wiring to range meter, 5 set-ups.....	6,000
Miscellaneous installation expense	4,875
Freight and traveling expense.....	2,000
Engineer and assistant	5,400
Total.....	27,700
Less salvage on meters which it is proposed the member companies take off our hands.....	3,700
Net cost	\$24,000

4. Individual Printometer Method. This provides for the installation of a printometer on each range circuit. Each printometer is to be equipped with Warren motor drive so that it is possible to synchronize the operation of all of them. A watt-hour meter of standard type on which is mounted a contact device for operating the printometer will be installed at each range service.

150 G.E. Co. printometer with Warren motor.....	\$24,915
150 W.H. meters with contact device.....	2,585
Installation expense	5,000
Freight and traveling expense.....	2,000
Engineer and assistant	5,400
Total.....	39,900
Less salvage on meters which it is proposed the member companies take off our hands.....	12,400
Net cost	\$27,500

Combination of Methods Recommended

Of the various methods, 1 and 2 represent the smallest expenditure, but the results obtained at best would be only approximation and no way is provided to separate the lighting and range loads. On the other hand, method 3 or 4 will give accurate and dependable results based entirely upon recorded data and not involving any assumptions as to important but unknown factors. The committee has therefore wisely recommended that a combination of the distant dial and individual printometer method be adopted.

The need for this information in its most complete form is becoming more and more apparent as the actual work of making the survey in Spokane goes on. There have been many conflicting reports regarding the diversity of the range load and it is important that authoritative information be made available at the earliest possible date. For instance, in the preliminary survey of the districts in Spokane, it was found that on a feeder consisting of 314 residences having 160 ranges and water heaters, there was a five-minute peak of 420 kw. at the substation. This peak was taken during the month of February with the indication that it was higher earlier in the winter and such figures do not appear to coincide with similar data which have been collected and published on the electric range load.

Range Policy Dependent on Accurate Data

At the present time no utility is able to state definitely whether the electric range increases the system peak 500 watts, 1 kw. or 3 kw., and no central station is yet able to forecast what capital investment will have to be made to take care of the range load in future years. All data gathered so far depend to some measure upon approximation and until accurate data are secured a sound range policy cannot be set down. From the experience of the companies in the Northwest it is only a question of time before electric ranges are generally used throughout the country and it is well-nigh imperative that the fundamental facts be ascertained on which to predicate remunerative rates and to plan distribution systems suitable for supplying both range and lighting loads in residential areas.

If such information is not developed there is grave danger that the electric range load will be permitted to grow haphazardly and get so far out of hand as to create a situation, from the standpoint of rates, distribution capacity, investment and so on similar to the question of power factor regulation brought about by the enormous increase in induction motor load during the last five years.

Spokane Survey Will Serve Three Purposes

The Range Committee so far has gathered together much valuable information on the subject. It is, however, confronted by the fact that all available data are at best of a fragmentary nature which cannot be combined or presented in a composite manner from which definite principles can be evolved. In starting the survey in Spokane due recognition has been taken of this lack of reliable information and a practicable method is proposed for finding out many unknown facts. The work which is being conducted in Spokane should have the support of every central station man in the industry. From the executive viewpoint it will provide the necessary data from which he can determine the capital investment necessary to serve this business, what rates are necessary to make range service profitable and to what extent he should go in further developing the business. For the central station engineer data to be collected will be particularly valuable in that it will be possible to establish certain formulas for laying out distribution systems to meet the probable future demand. The collection of these data by engineers will give them an ideal opportunity to observe the characteristics of this load as it develops on the individual customer's premises, in groups of three or more, and the consequent effect the demand has upon distribution and substation transformers as well as upon the total system peak. For the commercial man the completion of this investigation will establish definite knowledge as to the desirability of the electric range as a load and revenue builder and he will be relieved of the present necessity of trying to analyze the value of the business from a basis of vague assumption with but few definite facts. It will enable him to devote his attention to methods of selling and maintaining service on the electric range.

In this investigation it is fortunate that the executive, the engineer and the commercial man will be so drawn together by a common interest. It will enable each to study and consider the other's problems, which should make for a much better understanding on the part of all three of the difficulties which each must overcome.

Whether the individual central station company has been actively engaged in building the electric range business or not, there is a very strong inclination on the part of many people to want to cook electrically. It is more than mere curiosity and when there is such a general demand the public will be served, somehow. If ample provision is made so that this range survey may be carried through to completion, central stations will no longer be working in the dark as to the characteristics and requirements of the electric range, but will be able to plan for and take on this business in an intelligent manner.

Fostering the Family Spirit Among Utility Customer-Owners

DEVELOPED to the highest degree, the policy of customer ownership of public utilities has, as its ultimate aim, the inculcating into the minds of the stockholders the feeling that they are partners in the enterprise that serves them. When the stockholder feels that his money is invested in a concern that

offers safety of investment, pays him a satisfactory dividend rate and at the same time provides him with a necessary service at a reasonable rate, he is inclined to regard the company as his company and himself as a partner in the enterprise.

The advantages of the principle of customer ownership are numerous. Both the individual and the utility are benefited by the practice. The investor gains in that he knows that his money is invested in a concern that is providing himself and his neighbors with essential service, and since he is on the ground to watch the operation of the company he is in a position to tell whether or not his and his friends' money is being administered wisely. The utility gains in that it secures the active support and good will of many persons that might otherwise be only tacitly friendly.

It is evident, then, that the fostering of the partnership feeling is to be desired by both the individual stockholder and the utility. The stockholder is anxious to know what is being done with his money and what plans are being made by the company in which he is a partner for future developments in order that the service which the company is rendering may be maintained at the proper level. The utility anxious to keep up the support and good will of its stockholders, is equally desirous of developing the partnership feeling among its customer-owners.

To secure this partnership feeling of its customer-owners, the Southern California Edison Company, in common with other Western electric public utility companies, has been supplying information concerning the activities of the company, to its stockholders through the medium of a company house organ. In "Edison Partners," the company has been telling of what the company has done and what it intends to do. The purpose has been to inform the owners as to what is being done and to make them feel more firmly that they are actually partners in the company.

Deviating from the practice of telling about the activities of the company, the April issue of "Edison Partners" was dedicated to the "Junior Partners." The purpose of this issue was to get the company's

THROUGH the columns of its house organ the Southern California Edison Company has endeavored to acquaint its owners with some of the children who are also holders of company stock. The company's motive was to develop the idea that all Edison stockholders are "Edison Partners."

stockholders to realize that, in addition to a large number of persons of mature age, there are numerous children that are also partners in the enterprise.

According to the records of the Southern California Edison Company there are 1,450 minors that are owners of company stock. In the recent issue

it was the plan to present these younger partners to the rest of the "Edison Family" in order that the family spirit might be furthered among the customer-owners of the company.

Plans were made for the securing of the photographs of the "Junior Partners" and in the January issue of the company house organ it was announced that the editor was anxious to secure pictures of all children in the families of Edison company stockholders. The request stated that informal pictures were wanted in order that the older members of the "Edison Family" might know what the younger generation looked like.

Immediately following the announcement that the company desired to secure the photographs of the children, pictures began to pour into the editor's hands. Each photograph carried the name of the child together with the address of the sender. A total of 250 pictures was received during the time that elapsed between the announcement and the time that the next issue of the magazine went to press. Only six of the pictures arrived too late to permit the editor to insert them in the group of "Junior Partners."

Four pages of the company magazine were devoted to the pictures of the children, a total of 244 pictures appearing therein. The first page of the issue presented a story concerning the "Junior Partners" and called attention to the large number of children who already owned stock in the company.

Upon receipt of each picture, a personal letter was sent to the parent of the child expressing appreciation for the cooperation. After the composite reproduction of the photographs was printed in "Edison Partners" a print of the entire four pages was mailed to each parent.

According to those in charge of handling the pictures, many exceedingly cordial letters were received from the parents of the children and all of these letters indicated that the writers were glad to be classed as members of the "Edison Family." The letters that were sent out following the receipt of the photographs were of semi-personal nature and furthered the family spirit among the recipients.



Four pages, similar to the one reproduced above, were used to present the pictures of 244 "Junior Partners" in the Southern California Edison Company.



Electrical Construction

By E. Earl Browne

It was at one time the custom to make up estimates on any old piece of paper at hand. Many contractors used note books, either loose-leaf or bound, and the data were recorded in hit-or-miss fashion. Very often a successful bidder discovered after the bid had been let that he had left out items of material or labor that increased his cost and decreased his potential profit. It happened all too often that these forgotten items amounted to more than the small margin that had been figured for profit.

Gradually the use of various forms for estimating came into practice and there were developed some very elaborate forms that went into great detail as to items. Many of these were expensive to use on account of the time consumed in filling in the information and also because they were cumbersome or awkward to handle. This resulted in increasing the time required for estimating and increased the cost of this particular part of the work. In view of the relatively small portion of estimated work that is ultimately closed to contract, this expense was often considered out of proportion to the benefits received.

The matter of forms for estimating received considerable attention from various individuals and from the many associations, such as the Association of Electragists, International; the various local associations, and the state organizations. The San Francisco Association of Electrical Contractors and Deal-

ers gave this matter extensive study and finally brought forth a set of forms that have worked well and have been economical in time and have eliminated the possibility of forgotten items.

Figs. 3, 4 and 5 are samples of the same job estimate as illustrated in Figs. 1 and 2 in the May 1 issue of the Journal of Electricity, except that it is shown on a set of forms gotten out by the San Francisco Association of Electrical Contractors and Dealers. The saving in time in listing and pricing the items when the form sheet, as shown in Figs. 1 and 2, is used is self-apparent as there is a total of but fourteen items to be priced, whereas in the detailed form there is a total of 259 items.

It will be noted that the difference in the final estimate totals is but 1/3 of 1 per cent, which is considerably more accurate than any estimator's figures on the quantity "take off" from the plans and specifications, and, as stated before, the feeling of certainty that no items of material or labor to install same are omitted greatly overbalances any such small seeming inaccuracies as shown by comparison of the two forms.

Both forms are designed primarily for conduit work, although the one shown in Figs. 3, 4 and 5 can be used for a knob and bushing or combination conduit and knob and bushing job where all outlets, circuits, feeders, sub-feeders, etc., are taken off in de-

		SERVICES AND FEEDS AND SUB FEEDS																			
		CONDUIT												WIRE							
FROM	TO	Dist. One Way	WIRE No.	Size	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	No. 14	No. 12	No. 10	No. 8	No. 6	No. 4	No. 3
Main Service		40	3	1						40											
Store #1																					
Meter Board		55	3	10			55											165			
"	" S. #2	55	3	10			55											165			
"	2nd Floor	50	3	12			50											150			
"	3rd Floor	60	3	12			60											180			
"	4th Floor	70	3	12			70											210			
"	5th Floor	80	3	12			80											240			
Totals							370			40					780	330					120

Fig. 3.

tail instead of the unit price per outlet method as employed by many contractors in figuring residences and flats. To illustrate the completeness of the material lists in the price form used in conjunction with Figs. 1 and 2 the following will serve to convince anyone of its value:

Ceiling and Bracket Outlets—

- 1—No. 54151 Box
- 1—No. 54 C 3 Cover
- 1— $\frac{1}{2}$ -in. Fixture Stud
- 6— $\frac{1}{2}$ -in. Locknuts
- 3— $\frac{1}{2}$ -in. Bushings

S. P. Push Switches—

- 1—No. 52151 Box
- 1—No. 52 C 14 Cover
- 1—No. 4401 Switch
- 1—No. 4077 O.B. Plate
- 2— $\frac{1}{2}$ -in. Locknuts
- 1— $\frac{1}{2}$ -in. Bushing

Single Convenience Outlets—

- 1—No. 52151 Box
- 1—No. 52 C 14 Cover
- 1—No. 5547 Receptacle
- 1—No. 5548 O.B. Plate
- 1—No. 5419 Cap
- 4— $\frac{1}{2}$ -in. Locknuts
- 2— $\frac{1}{2}$ -in. Bushings

Panel Board (10 circuits)—

- 1—Cabinet
- 1—Door and Frame
- 1—Panel Board

Item No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	12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THE following is a continuation of the General Ledger Account. The preceding items of this account appeared in the May 1, 1924, issue of the Journal of Electricity.

No. 51—Returns and Allowances.—The debit balance of this account represents the total amount of returns of and allowances on sales made to customers during the current year. This account should be debited with the amount of any returns and allow-

No. 60—Advertising.—The debit balance of this account represents the total amount expended for advertising purposes during the current year and should be debited with all amounts of this nature, from the sundries Dr. column of the cash book-journal.

No. 61—Automobile Expense.—The debit balance of this account represents the total amount expended during the current year for the upkeep and operation of all automobiles used in the business. This account should be debited monthly with the total of the auto expense Dr. column of the cash book-journal.

No. 62—Depreciation.—The debit balance of this account represents the total amount of depreciation charged off on fixed assets during the current year. This account should be debited at the end of

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ances from the sundries Dr. column of the cash book-journal, the credit to the customer's accounts being entered in the accounts receivable Cr. column. Any returns of or allowances on cash sales should be deducted from the amount of cash sales on the day the refund is made.

No. 52—Cost of Goods Sold.—The debit balance of this account represents the total amount of material and labor used on jobs finished and store sales made during the current year. This account is debited at the end of each closing period when a physical inventory is taken, with the cost of merchandise sold and labor consumed as outlined under analysis of accounts Nos. 10, Merchandise, and 11, Labor. It should be closed out into capital account (profit and loss) at the end of each year in accordance with Fig. 2.

each closing period with the proper percentages of depreciation as outlined under the analysis of Provision for Depreciation, Accounts Nos. 20-A, 21-A and 22-A.

No. 63—Doubtful Accounts.—The debit balance of this account represents the total amount that it is estimated will be lost out of current year's net charge sales due to uncollectible accounts. This account should be debited at the end of each closing period with one per cent of the net charge sales as outlined under the analysis of account No. 3-A, Provision for Doubtful Accounts.

No. 64—Freight, Drayage and Express.—The debit balance of this account represents the total amount paid for freight, drayage and express on merchandise received during the current year. This account should be debited monthly with the total of

the freight, drayage and express Dr. column of the cash book-journal.

No. 65—Heat, Light and Power.—The debit balance of this account represents the total amount expended for heat, light and power during the current year. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 66—Insurance.—The debit balance of this account represents the total amount expended for insurance during the current year. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 67—Interest and Discount.—The balance of this account represents the difference between the amount of interest and discount paid and the amount received during the current year. If the amount paid is more than the amount received, the account will show a debit balance; if less it would show a credit balance. This account should be debited and credited monthly with the totals of the Interest and Discount Dr. and Cr. columns, respectively, of the cash book-journal.

No. 68—Miscellaneous Expense.—The debit balance of this account represents the total amount expended for incidental items of expense during the current year that are not covered by the other specific captions of expense accounts. This account should be debited with all amounts of that nature,

from the sundries Dr. column of the cash book-journal.

No. 69—Rent.—The debit balance of this account represents the total amount of rent paid during the current year and should be debited with the amount of rent paid monthly from the sundries Dr. column of the cash book-journal.

No. 70—Salaries.—The debit balance of this account represents the total amount of salaries (exclusive of labor account, No. 11) paid during the current year, and should be debited monthly with the total of the salaries Dr. column of the cash book-journal.

No. 71—Stationery, Printing and Office Supplies.—The debit balance of this account represents the total amount expended during the current year for stationery, printing and office supplies. This account should be debited with all amounts of that nature, from the sundries Dr. column of the cash book-journal.

No. 72—Taxes and License.—The debit balance of this account represents the total amount of taxes and license paid during the current year, and should be debited with all such amounts from the sundries Dr. column of the cash book-journal.

73—Telephone and Telegraph.—The debit balance of this account represents the total amount paid for telephones and telegrams during the current year and should be debited with all such amounts from the sundries Dr. column of the cash book-journal.

ACCT NO. 50									
SALES									
DATE	ITEMS	FOL.	DEBITS	DATE	ITEMS	FOL.	CREDITS		
1923				1923			TOTAL		
Dec 31	Profit & Loss	12	27817.40	Jan 31	1982.65	1	2306.85		
				Feb 29	1853.40	2	2267.15		
				Mar 31	2041.85	3	2468.15		
				Apr 30	2136.70	4	2549.35		
				May 31	1942.55	5	2268.25		
				June 30	1836.40	6	2151.25		
				July 31	1928.65	7	2225.45		
				Aug 31	1943.10	8	2271.85		
				Sept 30	1826.45	9	2183.55		
				Oct 31	1793.90	10	2186.25		
				Nov 30	1786.75	11	2262.55		
				Dec 31	1712.60	12	2666.65		
			27817.40		2486.00		27817.40		

Fig. 2.

A Cooperative Opportunity for Electrical Dealers

A new field of display is now open to progressive electrical dealers. The Chester N. Weaver Company, San Francisco and northern California distributors for the Studebaker automobile, desiring to extend the field of their service to other industries, arranged with the Pacific Radio Trades Association to conduct a joint display of automobiles and radio equipment. The keynote of the display was the slogan "Radio all summer, this summer." No attempt was made to force the automobile to the front in the display or in the advertising, all of which was done by the company. Instead, the main feature of all publicity was the radio

ment dealers were put was to furnish the sets and to have competent salesmen on hand all of the time the sales room was open in order to explain the apparatus.

This unusual example of cooperation between two different classes of business resulted to the advantage of both and was declared highly successful, so successful, in fact, that it has already been requested that a similar cooperative display be made in another city. The event was extensively advertised by the automobile dealer both before the opening of the display and during the week in which it was held. This resulted in an average nightly attendance in excess



The importance of radio apparatus for summer vacations formed the keynote of the joint publicity program of the Chester N. Weaver Company and the Pacific Radio Trades Association. Radio sets were on display throughout the automobile sales room and radio concerts were daily features.

equipment that was on display throughout the entire building of the automobile company. Every effort was made to draw the public to the display rooms to see the radio sets, some of which were in operation. The sales rooms were attractively decorated with branches, grass, sand and pebbles to give the appearance of a summer camping ground and the impression was heightened by the addition of a limited amount of camping equipment. This style of decoration showed the radio equipment in a vacation environment and lent much to the effectiveness of the exhibit.

Each person entering the display rooms was given a numbered coupon ticket, one part of which was to be deposited in a locked box and the remaining part to be held. At nine o'clock each evening a drawing was held and the holder of the first ticket drawn from the box, if present at the time of drawing, was presented with a radio set. A different make of set was given away each night of the week and the sets were furnished by the individual members of the Pacific Radio Trades Association. Radio concerts were given during the evening, preceding and following the drawing, and music was also furnished by a Hawaiian orchestra, all of the members of which were employees of the automobile dealer. The only expense to which the radio equip-

ment of two thousand persons; the attendance in the afternoons being somewhat less. It is estimated that between fifteen and twenty thousand people had the opportunity to learn of radio equipment and its operation, and the major portion of this number listened to the short talks on radio operation that were given each night just before the drawing for the prize. These talks were made by radio experts and engineers and were non-technical. The sales as a result of this display cannot at this time be definitely stated but it is certain that the exhibitors were more than satisfied with the benefits derived and are enthusiastically seeking opportunity to stage similar demonstrations. The strong appeal of the automobile coupled with the interest in radio and electrical goods combine to make this type of demonstration effective in almost any locality.

I. M. Peckenpaugh, graduate of the Polytechnic College of Engineering, Oakland, Calif., and formerly in charge of motors and electrical construction for the United States Government naval service, has opened a contracting business at 707 Heliotrope Drive, Los Angeles, Calif. Through Mr. Peckenpaugh's recent connection with the service department of the Western Electric Company, he has been appointed exclusive service agent for that company.

Code Discussion by Sacramento Contractors and Wiremen

The engineering committee of the Contractors' and Dealers' Association of Sacramento and the City Electrical Department recently met with the local journeymen electricians to discuss the 1923 edition of the National Electrical Code. The meeting was attended by M. P. Canon, R. J. Finchley, E. M. Miller, and R. N. Phelan of the Contractors' and Dealers' Association, and Carl W. Beaton of the Sacramento Electrical Department. The discussion of the most important changes in the new Code was based on the articles by Claude W. Mitchell which have appeared in the Journal of Electricity. These were supplemented by memoranda of the association secretary and Carl W. Beaton of the Electrical Department. Two different samples of the new unit type of service switch were displayed and discussed. A general discussion followed and specific questions were answered by the engineering committee and the city electrician.

EMF Electrical Year Book Published.—The third annual edition of the EMF Electrical Year Book has been issued by the Electrical Trade Publishing Company, Chicago, Ill. It has been completely revised and contains a total of 1,550 pages. Of these 1,080 form the main reference text. In this text a conspicuous feature is the listing of manufacturers of almost every conceivable electrical product under some 3,200 classifications of equipment, over 7,000 manufacturers being represented. There are also over 7,800 separate trade name entries. The technical information includes over 5,900 definitions of electrical words and 600 encyclopedic topics on the various branches of the electrical industry and its leading activities.



The old "wise crack" to the effect that the building would stand, etc., is not to be charged against L. M. McGinnis of Sacramento, Calif., for his support in the future is to be given to the Lighting Fixture Dealers' Association of that city. The "Champion Two-Fisted Smiler" of Sacramento has recently been elected president of the aforementioned association. Mr. McGinnis receives mail addressed to Manager, Fixture Department, Scott Plumbing & Electrical Company.

Suggestions to the Amateur on Radio Installations

By J. M. EVANS

City Electrician, Modesto, Calif.

Radio installations have become so numerous and so many more are projected that the radio business seems to have one of the greatest immediate futures in the matter of volume. The increasing number of sets of varying hook-ups have frequently shown that some apparently proper methods will not give results. And poor results are not the only disturbing feature.

In some instances, antenna masts have fallen, causing personal injuries. Every effort must be made not only to see that the installation works satisfactorily but also to insure the utmost safety. For example, the pole must be substantial, at least 4 in. x 4 in., of good lumber, and should not be less than 3 in. x 3 in. of clear straight grained Oregon pine. If the pole is to be taller than thirty feet these dimensions must be increased. Each mast should be guyed at least four ways with galvanized iron wire, using not smaller than No. 12 B. & S. gage. At least two standard strain insulators should be inserted in each guy wire; one near the point of attachment to the mast and one not closer than eight feet from the ground, or roof, or surface under the guy. If the guy is more than forty feet between insulators another insulator should be inserted halfway between the two above mentioned. An ordinary porcelain cleat or knob as used in housewiring will not do.

Too small wire must not be used for the antenna. This wire must be No. 14, or larger, B. & S. gage copper, and the lead-in and ground wires should be the same size if of copper, but No. 17 copper-clad steel may be used. The lead-in and ground wires should be kept at least four inches from any other wire. For receiving station installations (and the following applies only to receiving stations) the lead-in and ground wires should be kept at least two inches from the walls, adjacent surfaces, floors, etc. An ordinary porcelain tube or a piece of flexible non-metallic conduit, called loom, will not do for bringing the wires into the house. A wall bushing that will keep the outside wires at least two inches from the wall and one that slopes up towards the inside to keep the rain from running into the house must be installed. There are a number of reasonably cheap lightning arresters that will operate at 500 volts or less. This must be installed so that it will have a separate ground from the ground on the set. In addition to this, an antenna grounding switch is recommended. This is the one place in which fuses must not be used.

The set ground and the lightning arrester ground should be kept two inches from all walls, floors, etc., and should be fastened to a water pipe with standard ground clamps.

The foregoing rules are embodied in Ordinance 121, N.S., of the City of Modesto, Calif., passed in 1918, which also requires that all radio installations be inspected by the city electrician.

One very common fault of the amateur set is to try for too good an aerial. In this as in other things the simpler construction is usually the better. An L aerial will probably give best results. It should be of one wire, at first, and

not too long, as the lead-in works as part of the aerial. If possible to avoid, power wires, tin roofs, etc., should not be paralleled with the aerial. A set probably will work very poorly if any part of the system is in metallic conduit. Many bends in the wire will frequently be another cause of trouble.

If a set squeals the noise may not be in the set itself. A regenerative set near may cause this trouble. Regenerative sets to the neighbors, radio-ly speaking, are like crying babies in an opera.

There are very strict rules that must be followed in the construction of transmitting stations and one who is planning to install such a set will find it to his advantage to consult the local city electrician before buying. There have been fires, in Modesto, caused by improperly installed radio sets. In those cases where the local ordinance has not been adhered to the insurance companies are slow to make full adjustment.

San Diego Contractor Builds Only All-Electric Homes

Oscar Dorman, building contractor of Coronado, without any thought of doing anything else, and in quite a matter-of-fact manner, is building one electrical home right after another and selling them like hotcakes, according to W. A. Lambert, district agent of the San Diego Consolidated Gas & Electric Company at Coronado. Mr. Dorman's homes are generally sold before they are completed and the demand continues for his convenient, moderately priced homes, fully electrically equipped.

So complete electrically are the little bungalows which this builder erects, that no provision is made for gas or other fuel anywhere in the houses. They are wired for electric ranges, are equipped with electric room heaters and water heaters, and the lighting is de-

signed with care. Outlets are plentifully provided, making for convenience in housekeeping in the small houses.

While Coronado is a community of many large and elaborate electric homes, the homes of millionaires and retired people, the moderate class of residences built are of exceptionally high order, with electrical conveniences ranking high in percentage to population. The homes built by Mr. Dorman are generally five and six-room California bungalows.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

Referring to your answer in the Journal of April 15, 1924, explaining how to handle Lease Contracts discounted on the books, please advise how that account should be shown on the balance sheet.

Answer:

The balance due the dealer by the customer would be included in the total of Accounts Receivable and the net amount due the discount corporation by the dealer should be deducted from that total. After the down payment of \$13 was collected by the dealer the balance of the April 15, 1924, transaction would show in the statement of condition as follows:

Accounts Receivable	\$132.00
Less Discount Corp.	118.80
Net amount due dealer	
(10% withheld)	\$ 13.20



Two of the recently completed, moderately priced, fully electrically equipped homes built in Coronado by a progressive builder specializing in electric homes exclusively.

JOBBER, DEALER AND SALES AGENT



Introducing the New Product on a Broad Scale

Meetings and Advertisements Used to Inform Consuming Public of Advent of New Types of Electric Motors

A few months ago the General Electric Company was ready to announce two new designs in the small-motor field. One was a polyphase induction motor, for 40 deg. continuous duty, made in sizes from $\frac{1}{4}$ to 15 hp.; the other a single-phase motor, constant speed, for 40 deg. continuous duty, and made in sizes from $\frac{1}{4}$ to 10 hp.

The problem confronting the General Electric sales department in San Francisco was how to get their story across to the consuming public on a wholesale basis in order to cover the field as completely as possible, and bring about a consumer demand in the interest of their jobbers and retail distributors.

Perhaps the largest field for motors of this type is in various agricultural applications, so after a great deal of study Frank E. Boyd, assistant sales manager in charge of the motors and merchandise department, devised a plan which was placed into effect with most satisfactory results. In a few words, the plan involved holding a series of so-called motor meetings at various points in the section of California north of the Tehachapi.

The responsibility for securing an attendance at each meeting devolved upon the salesman for the company at each point where the meetings were held. The same program was followed at each meeting so that a description of one will be equally applicable to any of the others.

At the Sacramento meeting the assembly hall of the Pacific Gas and Electric Company was secured for the occasion. The meeting was called to order at 8 o'clock by W. J. Delehanty, local salesman for the company, who introduced E. O. Shreve, manager for the company in San Francisco. Mr. Shreve gave a brief talk on the General Electric Company, its methods, principles of operation and ideals. He spoke particularly on the work done in the General Electric Company research laboratories through which new ideas and designs were developed and tested before being placed upon the market.

Mr. Shreve was followed by Mr. Boyd, who made the principal talk of the evening. Mr. Boyd with the assistance of lantern slides went into great detail as to the design, characteristics and performance of each of the new motors which were being offered. Mr. Boyd's talk was especially well received, the audience showing its genuine interest in the subject by the close attention that was paid.

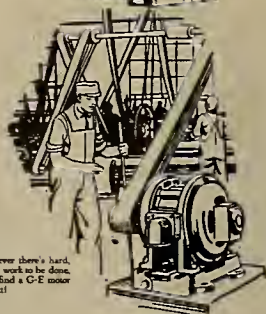
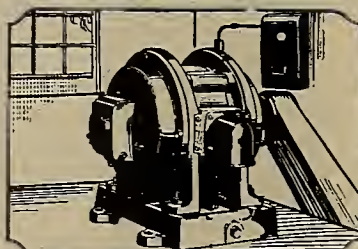
O. A. Schlesinger of the Western Electric Company followed Mr. Boyd

and spoke as a distributor for the General Electric Company motors in question. Mr. Schlesinger was followed by M. Rhine, assistant sales manager in charge of industrial and marine sales, who spoke briefly upon the develop-

ments made by the General Electric Company in the field of marine propulsion.

The total time consumed was about two and one-half hours, namely, from 8 p.m. to 10:30 p.m. It was especially interesting to note the attendance, which in this case was one hundred and thirty-five men coming from a radius in some cases of forty or fifty miles, thus showing their intelligent interest

Accept no other as "Just as good" buy a G-E



Wherever there's hard, honest work to be done, you'll find a G-E motor doing it!

YOU expect adequate return in service from your motors. Then select the motor that is sure to give that service!

Investigate the new G-E Three-Phase motor before making your next power purchase for shop, factory or farm. This motor is built for hard, continuous service. The vital parts are protected from dirt, grease, water and alkali dust. Windings, instead of being exposed, are embedded in a solid insulating compound. Bearings are steel shell, hard babbitt lined. Rotor winding is cast in one piece, eliminating joints and connections.

This motor is designed according to the same exacting manufacturing standards and the same advanced engineering principles applied to the G-E generating and transmission equipment used in the great power developments of California.

See your nearest G-E motor dealer listed below. He will go over your power requirements and specify the right motor for your job.

Complete motor stocks are maintained in San Francisco, supported by a staff of experts continually at your service.

GENERAL ELECTRIC

FOR FULL INFORMATION GO TO ANY OF THESE G-E DEALERS

Bell Electric Co., Auburn
Bird Electric Co., Chico
Byron Jackson Pump Mfg. Co., San Francisco
Calif. Hydraulic Eng. & Sup. Co., San Francisco
W. R. Camp, Sacramento
Capitol Electric Co., Sacramento
Frank Carr, Ryde
Conger's Electric Shop, Woodland
Crane Company, Sacramento
Dahlmeyer's, Oroville
Harry R. Decker, Calistoga
Duncan's Hardware Store, Red Bluff

Parm Engineering Service, Florin
Geo. C. Foss, Sacramento
Gridley Electric Co., Gridley
A. R. Hancock, Willows
Hancock's Electric Store, Oroville
L. C. Kimball, Elk Grove
Beni P. King, Dixon
Krogh Pump & Mch. Co., San Francisco
G. C. Kuechler, Sacramento
Layne & Bowler Corp., San Francisco
Loppen & Hawley, Sacramento
McCarley Smith Mercantile Co., Cottonwood
Puccinelli Dehydrator Co., Los Gatos

Roberts Engineering & Constr. Co., Marysville
Simonds Machinery Co., San Francisco
Solano Supply & Construction Co., Suisun
Sterling Electrical Co., Sacramento
Taylor's Foundry & Engineering Co., Grass Valley
Vacaville Water & Power Co., Vacaville
Vallejo Electric Light & Power Co., Vallejo
Valley Construction Co., Sacramento
Weider's Electric Works, Woodland
Williams Hardware Co., Williams
Woodin & Little, San Francisco
Yuba Mfg. Co., Marysville

Facsimile of one of the advertisements used in the campaign that introduced the new motors.

and desire for further enlightenment as to the progress that had been made in motor development.

In all there were thirteen meetings held, as follows:

Date	Place	Attendance	G. E. Salesman in Charge	Speaker
Jan. 17	San Francisco	140	F. O. Sievers	F. E. Boyd M. Rhine
Jan. 22	Oakland	135	G. L. Beaver	R. M. Alvord F. E. Boyd M. Rhine
Jan. 24	San Jose	102	C. A. Binns	R. M. Alvord F. E. Boyd
Jan. 29	Stockton	80	S. G. Gearhart	F. E. Boyd E. O. Shreve
Feb. 1	Modesto	81	S. G. Gearhart	F. E. Boyd A. V. Thompson
Feb. 5	Fresno	104	W. C. North	R. M. Alvord F. E. Boyd A. V. Thompson
Feb. 7	Visalia	91	W. Eckley	R. M. Alvord F. E. Boyd
Feb. 8	Bakersfield	85	C. F. Forsberg	F. E. Boyd M. Rhine
Feb. 19	Chico	71	J. R. Himmelsbach	F. E. Boyd M. Rhine
Feb. 26	Sacramento	135	W. J. Delehanty	F. E. Boyd M. C. Hixson John Hood M. Rhine E. O. Shreve A. C. Thompson
Feb. 28	Santa Rosa	95	J. M. Dodds	F. E. Boyd A. V. Thompson
Mar. 4	Marysville	76	W. J. Delehanty	F. E. Boyd M. Rhine
Mar. 14	Eureka	56	J. M. Dodds	C. M. LeCont M. Rhine
13 Meetings		1,251	Total Attendance	

Since the motor-meeting phase of the sales campaign was completed, a series of advertisements has been prepared by Evans & Barnhill of San Francisco for insertion in certain country newspapers. A facsimile of one of the advertisements is reproduced herewith in order to show how closely the advertising campaign ties in with the motor-meeting phase and also how the names of the local General Electric dealers are made a part of the newspaper publicity. So that the dealers might participate to the fullest degree in the benefits derived from the campaign, a portfolio of the complete advertising was given to each

in advance of the publication date.

During the course of the motor-meetings part of the sales campaign, the General Electric Company officials, actively in charge, became really a sort

of flying squadron. They were traveling from one town to another holding two or three meetings per week in some cases until they felt that the ground had been thoroughly covered so far as that particular type of publicity was concerned.

The whole story constitutes an interesting example of how a relatively high-priced apparatus can be sold not merely to individuals but to groups of individuals even of an entire geographical section of many thousands of square miles in extent, at comparatively low cost and with most satisfactory results to both manufacturer and distributors.

Handling Appliance Repair Work Systematically

Individual Box for Each Job Used by Modesto, Calif., Concern to Avoid Loss of Parts and Expedite Service

Repairing and reconditioning of electrical appliances has come to be an item of considerable importance to the electrical contractor-dealer. This minor repairing has attained such importance that managers of electrical establishments have devoted considerable attention to the best means of attending to the work. Competent workmen have been employed to do the necessary work and the actual repairing has been found to be the simplest item in connection with the transaction.

One of the principal difficulties that has developed is the keeping of the the parts, to be repaired, in such a way that any clerk in the store can readily find them when the customer calls for them. In general it has been found that tags attached to the article are not sufficient means of identifying the parts that have been left for repairing. Tags may be removed in the workshop and as a result the appliance may be returned to the salesroom without any identifying mark. In addition to this, customers may bring in appliances in

a disassembled condition with the result that each part must be tagged separately or the separate parts must be tied together. Either of these practices naturally takes up time and the possibility of error is not entirely eliminated.

No little amount of inconvenience has also been brought about by the fact that appliances have been left around either the salesroom or workshop awaiting repairing and delivery. In many cases the appliances have been lost or have been misplaced so that clerks have wasted a large amount of their own and the customer's time in endeavoring to locate them. The customer naturally draws the conclusion that the store is not run on a businesslike basis and doubts whether or not the concern is adequately equipped to do the repairing. Appliances in need of repair, placed at random about the salesroom, tend to detract from the display value of the rest of the interior and leave an impression of disorder in the mind of the customer.

A. O. Sullivan of the Sullivan Electric

Company of Modesto, Calif., has recently installed a system in his store which has been found to be most satisfactory in the handling of appliances brought in for repairing. The principal factors in Mr. Sullivan's system are a number of wooden boxes, designed to hold appliances brought in for repairs. The boxes are large enough to hold any of the smaller appliances and are of the same size so that they may be interchanged in the stand devised for holding them. Each box is fitted with a brass finished card container which permits the person taking the order for repairs to place a card on the front of the box, stating to whom the appliance belongs.

To enable employees of the company to quickly make out cards that will identify the repair parts, Mr. Sullivan has prepared a special card that just fits in the container on the front of the repair box. This card has spaces for the customer's name, address, the date and the number of articles brought in for repairing. In filling out the card, the clerk writes the last name of the

Name.....

Address.....

Date.....

No. Articles.....

The card, reproduced above, is made out by the clerk and is placed in a brass holder on the front of the repair box. The box is always kept in alphabetical order with other boxes containing repair work.

customer first in order that the box that contains the parts may be placed in its proper place in the stand. This stand, for holding the boxes, is so designed that the boxes are kept in alphabetical order according to the last name of the person owning the appliance. As the device to be repaired is received, all of the parts are placed in the box which is then placed in the compartment corresponding to the initial of the last name. This compartment is located just behind the counter and presents an attractive and orderly appearance.

When the box containing the appliance to be repaired is removed from the stand in the salesroom, it is taken to the repair department and is placed in a similar compartment arranged in the same way. The workman at the repair bench takes the work according to the date it was received and keeps only one box on his bench at a time. In this way all loose parts are kept together and there is no need to tag each individual part.

After the necessary repairs have been made the box is returned to the salesroom and is placed in the proper compartment. Any clerk in the store can immediately determine whether any particular job has been done by looking in the proper compartment. The result is that customers are not kept waiting and counters are not cluttered up with numerous appliances.

INDUSTRIAL NEWS



Power Bond Issue for \$21,000,000 Defeated in Los Angeles

Unofficial returns on the \$21,000,000 bond issue for the Los Angeles Bureau of Power and Light indicate that the measure was rejected by the voters of the city in the election of May 6, by a narrow margin. The final count showed that the measure failed to receive the necessary two-thirds vote by 2,430, the returns being 104,224 for the bonds and 55,757 against the issue. The funds which the Bureau expected to derive from the bonds were to be used for financing extensions and betterments to the municipal distribution system over a period of three years.

Reports from Los Angeles state that the Power Bureau is preparing to re-submit the measure at an election in August by means of an initiative petition. Should this procedure fail, and there is considerable question as to its legality under the present city charter, the bond issue cannot be placed before the public until Nov. 6, 1924, or two days after the general election. Thus, it is pointed out, the city will be without funds until May, 1925, when the city primaries take place, unless a special election is called. It is estimated that such a special election would cost approximately \$100,000 and it is doubtful if the city council could be induced to call one for the purpose of voting bonds for the Power Bureau alone.

It is also reported that the Bureau will seek to have special legislation passed which will reduce the number of votes necessary to pass bond issues for revenue-producing utilities to a majority vote instead of a two-thirds vote as at present. It is pointed out that this may be a possible means of getting out of the present difficult situation.

This is the second consecutive attempt of the Power Bureau to obtain funds for extensions and betterments which has been defeated. A \$35,000,000 bond issue which included \$25,000,000 for starting development on the Colorado River failed to carry by a wide margin last June. The Bureau has had no money available from bond issues for three years and at one time last year was reputed to be in such financial straits that it was forced to borrow a large sum from the general tax fund of the city.

On the ballot which carried the power bonds were other bond issues totaling \$46,900,000, all of which were passed with substantial margins. The same condition held in 1923 when the power bonds were the only issue on the ballot to be defeated.

The largest issue to pass in the May election was the county flood control bonds which appropriated \$35,300,000 to be used in the construction of dams,

reservoirs and waterways necessary to harness the flood waters of the San Gabriel and San Fernando valleys.

The "straw vote" conducted on the proposition as to whether or not the city should participate in the development of Boulder Canyon dam on the Colorado River was overwhelmingly in favor of such procedure. The vote, however, has no legal status and involves no expenditure.

A.E.C. Urges Committee Report on Muscle Shoals Project

No disposition should be made of Muscle Shoals until a thorough investigation has been made by a joint committee of Congress, it is asserted by the American Engineering Council in a report submitted to George W. Norris, chairman of the Senate Committee on Agriculture and Forestry. The engineers find that the expectation of cheaper fertilizers immediately is unwarranted, and that the synthetic process of nitrogen fixation has altered the whole situation. Exhaustive inquiry by an impartial technical commission is urged, the Engineering Council offering its assistance in this task.

The engineering report, prepared by a special committee sitting in Washington, in response to a request by Senator Norris, was made public by the president of the Council, Ex-Governor James Hartness of Vermont. The report states that any disposition of the power plant should have as its base provisions that are in substantial accord with the Federal Water Power Act.

File Application for Mokelumne River Power Project

An application for a preliminary permit has been filed with the Federal Power Commission by Stephen E. Keiffer, of San Francisco, covering a development in the Mokelumne River in California. He plans to divert that stream into a large reservoir on Dry Creek, at a point 20 miles northeast of Lodi. He plans to develop 20,000 hp. and in addition will use water for irrigation purposes in the Sacramento Valley.

This project is in conflict with an application previously filed by the Construction Company of North America, of San Francisco.

Large Direct Current Generator Installed in Portland.—Installation of the largest direct current generator on the Pacific Coast has recently been made by the Northwestern Electric Company of Portland, Ore. The new unit is a 2,500-kw. motor generator designed to furnish direct current for the underground system serving the business section of the city.

Paper Company Asks for Seattle Electric Power Contract

The Puget Sound Pulp & Paper Company has presented to the City of Seattle a proposed power contract, by which the city is to furnish the company 26,000 kw. at a flat rate of \$33,426 a month, to supply power for the company's proposed new \$1,000,000 paper and pulp mill to be established in Seattle. The blank form contract prepared by the paper company's legal department has been referred to the finance and city utilities committee.

J. D. Ross, superintendent of lighting, approves the pending contract but admits that its acceptance by the city would make necessary either the next proposed step in the Skagit development or the enlargement of the Cedar Falls plant. Mr. Ross has approved the rates suggested, and will make a complete report to the city council committee, containing suggestions as to plans.

Mr. Ross' plans for enlarging the Cedar Falls plant contemplate increasing the storage in Cedar Lake by building a higher dam at the site of the present crib dam, and then constructing a tunnel that would tap the bottom of Cedar Lake and lead to the Cedar Falls power plant. He estimates the cost at \$1,750,000 and that the output of the plant would be increased to 25,000 kw. the year around.

Philip Tindall, city councilman, opposes the proposed power contract with the paper company, alleging that it will definitely commit the city to an additional investment of \$15,000,000 to \$20,000,000 at Skagit, and contending that the proposed enlargement of the Cedar Falls plant would not provide the required power. He also attacks the proposed rate, claiming that it figures about \$15.60 per kw. year for primary power, which he claims is about half the cost of production including maintenance and operation charges, depreciation, interest and redemption allowances. He also charges that the ordinance as drawn would permit the pulp company to sublet its contract.

Fifty Per Cent of Signatures for Water and Power Initiative Measure Secured.—The California State Water and Power Act Committee has filed with Harry Zemansky, registrar of voters, San Francisco County, a petition bearing 38,000 signatures to place the Water and Power Act on the November, 1924, California state ballot. The petition contains more than half of the 73,000 signatures necessary for the entire state to insure the measure being placed before the people at the election. Petitions are also being circulated in other California cities, including Los Angeles, Sacramento, Stockton, San Diego and Oakland.

Suit Filed to Prevent Evaluation of L.A. Gas & Electric

Suits have been filed in the superior courts of Los Angeles County by the Los Angeles Gas & Electric Corporation to enjoin the city from spending the \$50,000 appropriated in two ordinances passed at the May 6, 1924 election for the purpose of evaluating the properties of the privately owned utility. Two ordinances passed by the city council appropriating \$5,000 for work already done by the Railroad Commission and \$45,000 for completing the evaluation were placed on the ballot by referendum. Both carried in the last election.

The suits instituted by the company hold that the ordinances are illegal. The city will not be able to proceed with the evaluation until the suits are settled unless the Railroad Commission is willing to proceed with the work and take its chance of receiving remuneration at some later date.

Since the acquisition of the distribution lines of the Southern California Edison Company, the Bureau of Power and Light has been agitating the taking over of the electric properties of the Los Angeles Gas & Electric Corporation. Were this done, the Bureau would then have an absolute monopoly of the distribution of electric energy within the city limits.

The attempt of the Bureau to secure an appraisal of the properties of the company has been the subject of court litigation since the movement started.

Municipal Ownership Question Up in Two Colorado Cities

Municipal ownership and operation of electric light plants in two Colorado cities is to be decided shortly for, according to latest reports, only one barrier remains in the situation both at Loveland and Colorado Springs.

The recent decision of Judge J. Foster Symes in the United States district court at Denver denying the petition of the Franklin Trust Company of New York, representing a bondholders' protective committee of the old Western Light & Power Company, leaves the Loveland situation only dependent on the final report to be issued by the state public utilities commission. The city council, however, is said not to regard the opinion of such a regulatory group because of the powers granted in the home rule charter of that community. As a consequence, orders have been given to proceed with the preliminary work of building the new hydro plant, the contract for which is held by the Hendrie & Bolthoff Manufacturing & Supply Company of Denver.

The fight in Colorado Springs is at the boiling point. Utility men in the mountain region are watching the situation closely in its final development before the election on May 20. Both sides of the issue are questioning not only the sincerity but also the veracity of the opposition. This is reflected in the volume of newspaper advertising appearing daily relative to the issue.

Inasmuch as the fight does not include any franchise consideration for a private company, the outcome of the election will determine whether or not any further privileges will be extended to the Colorado Springs Light, Heat & Power Company or any other utility operating organization, provided the taxpayers do not pass the bond issue.

With the recent announcement that A. E. Carlton, Colorado Springs capitalist, was considering the construction of an electric generating plant at the Golden Cycle ore reduction mill, proponents of municipal ownership look upon it favorably because the mill is at present the largest customer of the present plant and the load would have to be taken over by the city plant if the bond issue carries, but with the establishment of its own isolated plant, the maximum generating capacity figured by the city in its plans could be materially reduced and this likewise would slice over \$200,000 off the necessary bond appropriation.

Opponents of municipal ownership interpret the movement with equal favor because they say that if the Golden Cycle load is not provided the city operated plant the consequent loss of the largest single power consumer will be reflected in increased rates to private customers. They also point out that the claim of the proponents claiming favoritism to the mill in power rates could be disproved if the Carlton interests proceeded in the construction and operation of their own plant.

Hydro Developments on Skagit Tributaries Proposed

Development of hydroelectric plants with a combined capacity of 3,750 hp. at an estimated cost of \$145,000 is proposed in three applications filed at Olympia, Wash., with Marvin Chase, state supervisor of hydraulics, by Allen R. Moore, of Mt. Vernon, for water rights on Pressentin, O'Toole and Cumberland Creeks, all tributaries of the Skagit River.

The Pressentin Creek application calls for 40 sec.-ft. of water, the construction of a pipe line 1½ miles long and a dam 30 ft. high, 120 ft. long on top and 12 ft. long on the bottom. The water will be used at a 1,000-ft. head and develop 2,000 hp. at an estimated cost of \$75,000.

The O'Toole Creek plant will use 15 sec.-ft. of water at a 1,000-ft. head, developing 750 hp. The development will involve construction of a dam 45 ft. high, 120 ft. long on top and 36 ft. long on the bottom, and a pipe line one mile long, the cost being estimated at \$30,000.

The Cumberland Creek plant will cost \$40,000 and develop about 1,000 hp., using 20 sec.-ft. of water at a 1,000-ft. head. The dam will be 50 ft. high, 200 ft. long on top and 22 ft. long on the bottom. The pipe line is to be one mile long.

Flood Prevention Crews to Work by Electric Light.—In order to carry on flood prevention work near Pueblo, Colo., on a night and day schedule, one of the companies engaged in the contract of moving the railroad yards and placing a new river channel where the railroad yards now are, has arranged with the Southern Colorado Power Company to light the area of operations for more than two miles of length and 2,000 ft. in width. Six 2,000-cp. New Giant Duplex projectors will be used.

Bend, Ore., Considers New Street Lights.—At a recent meeting of the city council of Bend, Ore., a 100-light system of ornamental "white way" lighting was considered. This would provide for the illumination of several blocks in the center of town.

Colorado Power Co. Is Acquired by Doherty Interests

Control of the Colorado Power Company has recently been acquired by the Cities Service Company of New York, N. Y. Announcement of the purchase of the majority of the common stock of the Colorado Power Company was made by Clare N. Stannard, vice-president and general manager of the Public Service Company of Colorado, upon receipt of the news from Henry L. Doherty, president of the Cities Service Company.

By the purchase of the majority of the common stock of the Colorado Power Company, the Doherty interests come into control of the \$18,000,000 power and light plant of the Colorado company on the Grand River near Glenwood Springs, Colo. This plant supplies light and power to Sterling, a neighboring town in eastern Colorado, and to Salida, Glenwood Springs, Alamosa, Cripple Creek and Leadville. The systems of the Public Service Company of Colorado and of the Colorado Power Company have been connected for some time and the latter company has been selling current to the Denver utility.

A statement issued from the office of the Public Service Company of Colorado states that "acquisition of the property of the Colorado Power Company places the Public Service company in a very strong position. The territory now served by the Public Service company extends practically from Glenwood Springs on the west, Cheyenne on the north, Sterling on the east, and Alamosa and Salida on the south."

No radical changes in the personnel of the Colorado Power Company are contemplated as the result of the purchase of the control of the company by the Doherty interests, and it is understood that Norman Read of Denver will continue as vice-president and general manager. According to Mr. Doherty's telegram advising Mr. Stannard of the purchase of the Colorado company, representatives of the Public Service Company of Colorado and Henry L. Doherty & Company will occupy positions on the board of directors of the Colorado Power Company that will be vacated as a result of the purchase.

In his telegram, Mr. Doherty stated that the financing of the purchase of the Colorado company would be through the public offering of six per cent notes of the Public Service Company of Colorado in the principal amount of \$3,000,000 to provide funds for the payment of the common stock of the Colorado Power Company. It is understood that the notes will be sold to the public at par and accrued interest and that the arrangement is only for a short time as the Public Service Company of Colorado plans to sell to consumers a substantial amount of its preferred stock over the next twelve months.

Rates Reduced in Washington Cities.—The Pacific Power & Light Company has announced a 20 per cent reduction in commercial lighting rates, and a slight cut in residential rates in Yakima, Wash., and the adjacent territory served by the company. The company has also announced reductions in commercial and lighting rates in Walla Walla, which company officials claim will cut the gross revenues \$100,000 a year. New rates became effective on May 1.

Present Report on Developed and Potential Power

Geological Survey Announces Findings Concerning Hydroelectric Installations and Possibilities in United States

The Geological Survey, Department of the Interior, has just brought up to date its record of developed water power in the United States, which shows that there are now about 3,200 water-power plants of 100 hp. or more, having a total capacity of installed water wheels of 9,086,958 hp., an increase of about 1,160,000 hp., or nearly 15 per cent over the total in 1921, which was 7,926,958 hp. Of the present total 81 per cent is in public utility plants and 19 per cent in manufacturing plants. The corresponding percentages in 1921 were 78 and 22.

New York, with 1,542,983 hp., is still the leading state in developed water power; California, with 1,451,830 hp., is a close second; Washington, with 480,356 hp., is third; Maine, with 473,188 hp., is fourth; and North Carolina, with 431,500 hp., is fifth, displacing Montana, which ranked fifth in 1921.

Water-power development in the New England, East North Central, West North Central, and Mountain States has not kept pace with that in the other parts of the United States, as the following table shows.

Developed Water Power in Specified Divisions of the United States in 1921 and 1924.					
Division	Percentage of total in U. S.		Difference		
	1921	1924	+ = increase	- = decrease	
New England	16.5	15.3		-1.2	
Middle Atlantic	18.7	19.1		+ .4	
East North Central	9.3	9.1		-.2	
West North Central	5.6	5.1		-.5	
South Atlantic	13.6	14.3		+ .7	
East South Central	3.1	3.8		+ .7	
West South Central	.2	.2		0	
Mountain	10.4	9.7		-.7	
Pacific	22.6	23.5		+ .9	

The Pacific and Mountain States have in 515 plants with over 100 hp. capacity hydroelectric installations that total 3,019,834 hp. These installations are divided as follows:

Division and State	Total		Public utility and municipal		Manufacturing and miscellaneous	
	Number of plants	Capacity in horsepower	Number of plants	Capacity in horsepower	Number of plants	Capacity in horsepower
Mountain						
Montana	29	345,040	27	343,100	2	1,940
Idaho	46	270,918	42	269,021	4	1,897
Wyoming	10	7,886	9	7,560	1	326
Colorado	52	87,978	28	77,880	24	10,098
New Mexico	5	1,322	5	1,322	0	0
Arizona	8	38,760	8	38,760	0	0
Utah	66	115,329	51	110,344	15	4,985
Nevada	10	13,550	8	12,950	2	600
Pacific						
Washington	70	480,356	63	469,139	7	11,217
Oregon	74	206,865	52	147,620	22	59,245
California	145	1,451,830	118	1,432,748	27	19,082

A new estimate has been made of the potential water power resources of the United States including Alaska, Porto Rico, and Hawaii which it is physically feasible to develop under present conditions. Absence of market for power and inability to obtain necessary legal rights will delay development but should not prevent it. The figures given in the estimate show the 24-hour power available 90 per cent of the time and 50 per cent of the time at 70 per cent overall efficiency at both developed and undeveloped sites.

The estimate of the water-power resources of the United States is based on reports prepared by bureaus of the federal government, by states, by corporations, and by private engineers. In districts for which no water-power reports are available the data used are

taken from the estimate of the potential water-power of the United States prepared by the Geological Survey in 1908. In many of the reports from which the data were taken the estimates of potential power include the use of stored water for generating power. For districts where reservoirs are already built or where detailed field examinations show that such storage is feasible, these estimates have been used. All plans filed with the Federal Power Commission by applicants for permits to develop power on Colorado River show that power development on this river will include the use of stored water. This estimate therefore assumes that stored water will be used to equalize as far as possible the flow of Colorado River below the mouth of Green River. The estimate includes half of the potential power of Niagara River and of the international section of St. Lawrence River, though an international agreement is necessary to permit the full use of these resources.

The estimate of the potential water power of the United States prepared by the Geological Survey in 1908 was

based on the primary factors of slope and discharge. Very flat sections of rivers were not considered, but all other known potential water power of the United States was included, without re-

gard to the practicability of development.

The present estimate is based largely on reports that include only feasible sites and it therefore represents the potential power that can be developed when a market is available, yet it does not differ very materially from the estimate made in 1908. Allowing for the difference in assumed efficiency and for the inclusion in this estimate of the United States share of the potential power on Niagara and St. Lawrence Rivers, the present estimate of the potential power available 90 per cent of the time is about 21 per cent higher than the estimate of 1908 mainly because of the assumed use of stored water at places where detailed examinations and surveys have shown the existence of good reservoir sites. For the

same reason the estimate of power available 50 per cent of the time is 4 per cent higher.

This estimate cannot be considered final in all respects. Surveys and detailed studies are necessary to determine the most economical method of development, and these studies will probably lead to changes in the estimates of potential power in individual states. Additional data are especially desirable for some of the South Atlantic States. Future studies will probably be concerned principally with the use of stored water. These studies may result in a considerable increase in the estimate of the potential power available 90 per cent of the time but will probably affect to a much less extent the estimate of potential power available 50 per cent of the time. The estimates made in 1908 of total potential power without storage have been compared with recent estimates made for several states where reliable data show the power that can be economically developed, including that available by the use of stored water. As this comparison shows no radical difference in total results future studies will probably make no great change in the present estimate of the potential water power of the entire country.

Washington stands first among the states in potential water power, for power available both 50 per cent of the time and 90 per cent of the time. The state is closely pressed, however, by Oregon, California, and New York. A large proportion of the potential power in New York is available continuously due to the equalization of the flow of Niagara and St. Lawrence Rivers. The same is true of Arizona, whose water-power resources are mainly on Colorado River, where the flow can be controlled.

The estimate of the potential water power of Alaska, which is believed to be conservative, is based on a report covering southeastern Alaska and on a general knowledge of the conditions in the remainder of the territory.

In regard to the relation of present development to future possibilities, the Geological Survey reports:

"The percentage of the total potential power of the United States that has already been developed can be estimated only in a rough way.

"The capacity of water wheels at developed sites in Maine, New Hampshire, Vermont, and Massachusetts amounts to 131 per cent of the power available 50 per cent of the time at those sites. The wheel capacity in Massachusetts is nearly double the potential power for 50 per cent of the time at 70 per cent efficiency. A considerable percentage of the water power developed in these four states is used in industries where the power is required only 8 to 12 hours each day, with pondage at the power plant sufficient to store the stream flow at ordinary stages when the plant is not operating. This condition results in a large overdevelopment of equipment in many plants. The developed sites in Canada from coast to coast have an average wheel installation 30 per cent greater than the power available during the six months of greatest flow. It will be many years before all the water-power sites in the United States are developed to a greater extent than the sites that have been utilized in the four New England states. Assuming that all sites may eventually be devel-

oped to a point where the wheel capacity is 131 per cent of the power available 50 per cent of the time, we may say that the installed capacity will reach 72,000,000 hp. The present installed capacity of plants of 100 hp. or more is 9,087,000 hp., and on the above assumption of the ultimate installed

capacity, about 12.5 per cent of the potential water power of the country has now been developed."

Classification of the potential water-power resources of the United States by territorial divisions and by states for the Mountain and Pacific States is given below.

State and division	Available 90 per cent of the time		Available 50 per cent of the time	
	Horsepower	Per cent	Horsepower	Per cent
United States	34,818,000	100.00	55,030,000	100.00
New England	998,000	2.87	1,978,000	3.60
Middle Atlantic	4,317,000	12.40	5,688,000	10.35
East North Central	737,000	2.12	1,391,000	2.53
West North Central	871,000	2.50	1,844,000	3.35
South Atlantic	2,476,000	7.11	4,464,000	8.11
East South Central	1,011,000	2.90	2,004,000	3.64
West South Central	434,000	1.25	888,000	1.61
Mountain	10,736,000	30.83	15,513,000	28.19
Pacific	13,238,000	38.02	21,260,000	38.63
Mountain				
Montana	2,550,000	7.32	3,700,000	6.72
Idaho	2,122,000	6.10	4,032,000	7.33
Wyoming	704,000	2.02	1,182,000	2.15
Colorado	765,000	2.20	1,570,000	2.85
New Mexico	116,000	.33	186,000	.34
Arizona	2,769,000	7.92	2,887,000	5.25
Utah	1,420,000	4.08	1,586,000	2.88
Nevada	300,000	.86	370,000	.67
Pacific				
Washington	4,970,000	14.27	7,871,000	14.30
Oregon	3,665,000	10.53	6,715,000	12.20
California	4,603,000	13.22	6,674,000	12.13

Great Western Is to Build New Substation in Oakland

Application was made by the Great Western Power Company of California, on May 12, for permits to build in Oakland, Calif., a new combination substation and steam heat plant on property recently purchased by the company on Twentieth Street, near Telegraph Avenue. Construction will begin at once and the building will be completed early next year, it is expected. The cost, including installations to tie in the system, will be approximately \$425,000. This is the main item of construction work in the Oakland division of the Great Western, which will total about one million dollars during 1924.

The new plant will be a two-story building with a frontage on Twentieth Street of 65 ft. and a length of 135 ft. It will have a total floor area of 12,212 sq. ft., of which the electric substation will utilize 9,212 ft. The structure will be built of reinforced concrete, with an ornamental front and a massive doorway. Construction work will be done by the Great Western Power Company. Contracts will be let immediately for the steel.

In the new plant, direct current will be generated for operation of elevators in the downtown office buildings and for miscellaneous purposes, and electric energy will be transformed for distribution in the underground district. This station will have a transformer capacity of about 11,250 kw.

Permit on Kings River Sought by Irrigation District.—The Fresno Irrigation District has applied to the Federal Power Commission for a preliminary permit covering a power project on the Middle and South Forks of Kings River. The project is almost identical with that for which application was made by the City of Los Angeles. That application was rejected last year by the Commission when the city failed to give assurances for the prompt development of the project. Evidence to that effect will be required of the Fresno interests before the Commission entertains the application.

Contract for Cushman Project Equipment Is Signed

The Tacoma, Wash., city light department has signed a contract with Allis-Chalmers Manufacturing Company for furnishing and installing machinery equipment of the first unit of the Cushman power project. The contract price was \$630,780 for the turbines, generators, condensers, transformers, and minor equipment, and \$4,950 for installation. The time limits set for delivery of the machinery are so favorable that the completion of the power house is promised for at least a month before the schedule originally figured on by J. L. Stannard, chief engineer. The new contract signed brings the Cushman project now approximately \$540,000 below the estimate of the city's engineers. Contract for the cement required has been awarded to C. S. Barlow & Sons of Tacoma, on a bid of \$3 per barrel.

Work on the diversion dam at the Cushman power site will mark the next step in the \$4,000,000 project, according to Ira S. Davison, commissioner of light and water. The dam will be constructed above the permanent damsite and will be used to divert the water while the latter is constructed. The water will be turned into a tunnel that will carry it below the power house, which will be constructed along with the dam. The tunnel will later be utilized for carrying water into the power house.

Pueblo Steel Mills to Be Electrified.—Spending \$3,000,000 to electrify the steel mills at Pueblo, Colo., in the next two years is the program of the Colorado Fuel & Iron Company of Pueblo. A new power house will be built to furnish some of the current needed to change the plant from steam driven to electric while some of the power will be furnished by the Southern Colorado Power Company. The steel plant recently equipped two of its blast furnaces with electric precipitators, and will equip all of the furnaces with them before the two-year improvement program is completed.

California Oregon to Rush Work on Copco No. 2 Plant

Approval of the California Railroad Commission of an agreement between The California Oregon Power Company and the Pacific Gas and Electric Company for the construction of Copco No. 2 hydroelectric plant on the Klamath River, Siskiyou County, Calif., a transmission line from the plant to Delta, Calif., and for the sale of the output of this plant to the Pacific Gas and Electric Company, has been requested by The California Oregon Power Company. The plant would duplicate the Copco No. 1 plant and would be located about a mile down stream from the present hydroelectric installation.

Plans call for the installation of one 25,000-kw. generator with hydraulic turbine. It is the intention to complete the plant by April 1, 1925.

At the time of requesting the Railroad Commission's approval of the agreement, The California Oregon Power Company asked authority to issue and sell \$2,500,000 of series "B" bonds, \$1,500,000 of 7 per cent twenty-year sinking fund debentures, and \$1,000,000 of preferred stock. The proceeds from these issues would be used in the proposed improvement.

Construction on Steam Plant at Longview Progressing

Rapid progress is being shown on the construction of the steam electric power plant of the Long-Bell Lumber Company at Longview, Wash. The main power house is of reinforced concrete 310 ft. long, 192 ft. wide and 86 ft. high and will eventually contain six 6,000-kw. turbo-generators as main units. Three of these units are now being installed.

A conspicuous feature of the plant is the erection of two huge concrete stacks 300 ft. in height and sloping from an internal diameter at the ground level of 26½ ft. to 21 ft. at the top. The stacks will carry a huge Long-Bell trade mark which will be electrically lighted at night. It is planned to start operations in July.

Test Made on New Tacoma Oil Burning Equipment.—The oil-burning equipment of the steam generating plant of the Tacoma light department was recently placed under final test by T. A. Parker, chief operator of the plant. The oil-burning equipment is the same as that installed in the power plants of the battle cruisers recently built in Tacoma, and represents an investment of \$50,000. The test shows that by installing the oil-burning equipment to replace the original hog fuel burners, the two boilers in the plant, formerly rated at 4,400 hp., have been raised nearly 300 per cent in efficiency, and can furnish steam to produce 12,000 hp.

Range Campaign Being Conducted in Colorado City.—A Westinghouse range campaign now being conducted by the Arapahoe Light & Power Company was launched at Littleton, Colo., April 23, with a lecture, demonstration, and free luncheon to which all the housewives of the community were invited. Mrs. Margaret Gaffrey, a factory demonstrator, conducted the demonstration. The affair was arranged by Thomas McGrath, local manager of the company.



Downstream slope of new Butt Valley hydraulic fill dam of the Great Western Power Company.

Butt Valley Dam Completed for Great Western Company

The main section and spillway of the Butt Valley Dam of the Great Western Power Company in Plumas County, Calif., was completed April 30 by the Schultz Construction Company. The dam, which is of the hydraulic fill type, increases the storage in Butt Valley from 5,000 to 50,000 acre-feet. The new dam replaces a smaller one formerly located at the same point. The work just completed is the second project finished by the company this year, designed to secure additional power from the Plumas County development. The installation of the third unit in the Caribou plant of the company, adding 32,000 hp. to its capacity and bringing the total installation up to 96,000 hp., was the first project completed.

The dam just completed by the Great Western company is 1,200 ft. in length and contains 300,000 cu. yd. of material. Eight months were required to complete the construction work on the dam. The spillway that has been built at the dam site is designed to carry ten times the maximum recorded flow of the valley and provides ample security for the dam.

To render practically all of the water stored in Lake Almanor available for use in the Caribou plant, the company has recently let contracts for the dredging of the present 2½-mile channel in the lake leading to the mouth of the tunnel that leads to Butt Valley. At present there are several deep holes in the bed of the lake and with the channel that has been in use it has not been possible to make full use of the stored water through the tunnel leading to the Caribou plant. The excavation will be in the channel connecting the east arm of the lake with the intake of tunnel No. 1, which leads from Lake Almanor to Butt Valley.

An electrically operated ladder dredge will be used to deepen the channel in the lake. This dredge is being constructed in San Francisco and will be shipped to the lake in sections and will be assembled there. Seventy buckets, each of 2-cu.yd. capacity, will be attached to an endless chain on the dredge.

Record Span for Cushman Project Power Line Proposed

A new record span is contemplated in the plans for the construction of two 3-phase, 110-kv. transmission lines of the Cushman Power Project being built by the City of Tacoma, Wash. It is proposed that these lines skirt the south end of Hood Canal, extend northeasterly across the north ends of North Bay and Henderson Bay, and cross from Point Evans to the Tacoma side of "The Narrows," a distance of 6,153 ft. This is more than 1,100 ft. longer than the longest of four similar spans now in successful operation, namely: two crossings of Carquinez Straits, on San Francisco Bay, Calif., 4,427 ft. and 4,753 ft. long, respectively; one over the St. Lawrence River near Quebec, 4,801 ft. long; and one of 5,010 ft. over the Little Tennessee River in North Carolina.

Because of the swift tidal currents in "The Narrows," the rocky, uneven bottom and high, steep bluffs on the shore, the use of submarine cables was found impracticable; to go around to the lower end of the Sound would necessitate a greatly increased length of transmission line. Carrying the conductors over in the long span proposed was decided to be the best solution.

After thorough investigation and tests the messenger span system of supporting the electrical conductors was selected in preference to the self-supporting conductor type. Plans call for conductors of 300,000 circ.mil. copper or equivalent aluminum, supported by 1½-in. galvanized plow steel concentric wound messenger cables passing over large sheaves in the towers and continuing downward into heavy anchorages deeply imbedded in the earth. The conductors will be supported on suspension insulators hung from the messenger cable every 400 ft. It was found that the spacing of the supporting suspension insulators on the messenger wire was an important factor in damping out vibration and that with the proper spacing, vibration could be almost entirely eliminated. This type of construction obviates the problem of insulation of a large steel cable and fatigue and failure of the span due to

vibration. The St. Lawrence span is of this type and no failures have occurred. Although the cables specified are to have a strength of 195,000 lb. per sq. in. over the net steer cross-section, their safe working strength is figured at 90,500 lb. per sq. in.

There are to be six cables, comprising two separate circuits, each having its own pair of towers and anchorages, with a spacing between sufficient to allow one circuit to be cut out of service and repaired without danger from cables of the other circuit. This arrangement is expected to insure uninterrupted service, as each circuit will be capable of carrying the full load of the project indefinitely. The towers, of structural steel, are to be 150 ft. back from the brink on each side, those on the east shore to be 272 ft. high and those on the west 325 ft.

The plans are being pushed to completion in the endeavor to finish the proposed span in time to put it under test for at least a year before it goes into actual service.

The Cushman project is located about fifty miles from Tacoma on the Skokomish River. The initial development contemplates a 275-ft. concrete arch dam and a power plant of 36,000 kw. capacity. It is expected that work on the project will be commenced shortly.

Division of Universal Electric & Gas Company Property Petitioned.—The Great Western Power Company of California and the Pacific Gas and Electric Company have applied to the California State Railroad Commission for permission to divide the properties formerly owned and operated by the Universal Electric & Gas Company in the city and county of San Francisco upon an equal basis and to operate the same as parts of their respective territory. The application recites that on June 1, 1922, the Pacific Gas and Electric Company paid to the Great Western company the sum of \$1,127,303.82, or one-half of the purchase price of the property, and since March 1, 1922, the Great Western Power Company has operated for their joint account the properties now to be divided equally between the two companies.

Portland Men Visit Oak Grove Project.—The Oak Grove hydroelectric project of the Portland Electric Power Company was viewed from beginning to end on April 24 by about 200 of Portland's business men. This undertaking, started nearly two years ago, is now nearing completion, although 450 men are still employed along the line. It is hoped to start operating the plant in July as the demands during the coming dry season will be more than the present hydro plants can supply.

Improvements to Be Made by Pueblo Company.—The Southern Colorado Power Company of Pueblo, Colo., which only recently completed a million-dollar power house, has announced that it will expend, in the next few months, approximately \$400,000 for improvements. This company serves a territory of about 150 miles in length and will spend \$100,000 in the Arkansas Valley to increase substation and transmission line capacity. The sum of \$80,000 will be spent to increase the boiler capacity of the Canon City plant, and \$220,000 will be spent on distribution facilities.

Lumber Company Electrifies Two New Incline Railways

Extensive areas of timber lands are being opened up for the Yosemite Lumber Company by the construction of an electrically operated incline railway, extending from a point four miles west of El Portal, Calif., to the top of the mountain. The estimated cost of the line is \$500,000. By this construction, timber sufficient to last at least thirty years will be made accessible, it is estimated.

The incline starts from the main line of the Yosemite Valley Railroad about four miles west of El Portal, climbs steeply to an altitude of 8,400 ft. with a grade in some places of 83 per cent. The incline is in two legs with separate electric hoists operating on each leg. Incline No. 1 is operated by two 200-hp. motors while on Incline No. 2 one 400-hp. motor is used. Power necessary to operate the incline is being supplied by the San Joaquin Light & Power Corporation.

A 2,500-hp. steam turbo-generator has been installed at the sawmill at Merced Falls, burning waste from the mill and factory. In this way the plant will be made independent of outside power sources. The new steam boilers are completed, officially tested, and are being used while the older boiler equipment is being overhauled. The new unit will be controlled by a nine-panel switchboard. Approximately 30 per cent of the 2,500 hp. available at the plant is used in belt transmission to mill machinery. Eventually the company will use electricity throughout, according to plans.

Work on the incline started last summer and has been carried on without stop since that time with a crew of 200 men. The mill at Merced Falls has also been undergoing repairs and enlargement. The mill and incline will be ready and logging operations will start in May. Five hundred men will be em-

ployed in the woods and an equal number in the mill and on the incline. The box factory and the shipping department have been busy all winter. The road, after attaining its altitude, will be extended from time to time to keep pace with logging operations.

Pit River Company Refused New Permits on Power Sites

The Pit River Power Company has been advised by the Federal Power Commission that its request for a preliminary permit covering two sites on the Pit River in California cannot be granted. The company held a preliminary permit covering substantially the same projects for three years, when it was allowed to expire. The company points out that it has acquired 8,000 acres of land and has expended a considerable sum in preparation for the development.

While one exception to the water power act has been made by special legislation authorizing a second preliminary permit, this action was taken with the express understanding that it was not to constitute a precedent. The exception was made in favor of the Dixie Power Company. It is believed that the circumstances in the case of the extension sought by the Pit River company are less compelling than those in the other instance.

Water of Sevier River System, Utah, Must Be Conserved.—Warning has been issued by R. E. Caldwell, state engineer of Utah, to the effect that the water of the Sevier River system must be carefully used in order to avoid a serious shortage. According to press dispatches, the present supply in the reservoirs is considerably less than it was at the same time last year, and the spring run-off will be light.

1924 Construction Expenditures of Utilities Summarized

Gas and electric utilities of California during 1924 will expend \$84,583,986.09 on new construction work, according to figures compiled by the Division of Finance of the California State Railroad Commission. Approximately \$58,000,000 of this sum will be spent for additions and betterments to electric systems in the state.

It is impossible to present figures thus early in the year covering construction expenditures of all public utilities under the jurisdiction of the Railroad Commission, but the showing by gas and electric companies is practically complete, and has been listed by the Finance Division of the Commission as follows:

Estimated 1924 Construction Expenditures of Gas and Electric Companies in California.

Great Western Power Company of California	\$ 2,652,134.67
Los Angeles Gas & Electric Corporation	13,189,110.00
Pacific Gas and Electric Company	30,592,469.42
San Diego Consolidated Gas & Electric Company	2,615,000.00
Southern California Edison Company	26,288,000.00
Southern California Gas Company	3,200,000.00
Western States Gas & Electric Company	1,317,272.00
Total,	\$79,853,986.09
All other gas and electric companies	\$ 5,000,000.00
Total,	\$84,853,986.09

Seattle Ladies' Day Meeting Successful.—The Ladies' Day luncheon of the Electric Club of Seattle, held April 18, was one of the most successful ever held by the club.

Books and Bulletins

ALTERNATING CURRENT ARMATURE WINDING

By TERRELL CROFT, Consulting En-

gineer, Directing Engineer, Terrell Croft Engineering Company. 352 pages, 326 figures. Cloth, 6x9 in. \$3. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

A work designed for the practical man and covering the complete field of alternating current motor and generator work from the definitions of various machines and windings to simple re-winding of machines for voltage, speed, etc., for which they were originally designed, on to reconnecting of the stators for other conditions. A very comprehensive discussion is given on special and unusual connections. The chapters on testing are particularly valuable to the electrician not versed in electrical shop practice.

Division No. 6 covering standard diagrams for stator windings is a reference book in itself.

The questions following the first five divisions are reminders to the reader and give him an opportunity to examine himself on his knowledge after reading the divisions. The problems covering a division are given and the answers are given in the last five pages of the text.



View looking up the track of one of the electrically operated incline railways.

Meetings

Annual Banquet Is Held by Utah Engineering Council

The annual banquet of the Engineering Council of Utah was held at the Hotel Utah at Salt Lake City on the evening of April 28, and was attended by about 250 guests. Carl E. Grunsky, of San Francisco, Calif., president of the American Society of Civil Engineers, was the principal speaker. Mr. Grunsky read a paper on "The Influence of Engineering upon Social and Economic Progress." He reviewed the historic development of engineering from the crude practices of the ancients to the present day, and pointed out some of the many obvious engineering achievements which have influenced social and economic progress, mentioning transportation facilities as one of the most important.

Mr. Grunsky also remarked on the protest entered by the engineering society to the granting of a permit of 100 years to "an individual" for the development of Muscle Shoals without Congress' first having made a thorough investigation of the situation.

In commenting upon the appointment of Dr. Elwood Mead of California, noted irrigation engineer, as commissioner of reclamation, Mr. Grunsky stated that the engineering profession of the country was vindicated for its stand in representing the dismissal of one of its members, A. P. Davis, in favor of a "business man." "Every engineer in the country," he said, "resented the implication that an engineer is not a business man, and the appointment of Dr. Mead is a vindication of that stand. We are proud of the fact that an engineer is again at the head of the reclamation department."

R. K. Brown, president of the Engineering Council of Utah, delivered his annual report. D. C. Green, vice-president and general manager of the Utah Power & Light Company, acted as toastmaster at the banquet. Films on water and rail transportation were included in the program.

Report on Columbia Basin to Be Made at December Session

The report on the feasibility of the proposed Columbia River Basin irrigation project in the State of Washington will not be submitted to Congress until the December session, it was announced at the Interior Department on May 8.

Delay in the findings of the commission investigating this project, of which Francis M. Goodwin, Assistant Secretary of the Interior, is chairman, is due to the necessity of revising and reviewing the engineering, agricultural, and economic data so that they will conform to the recommendations contained in the recent report of the special advisory committee on reclamation.

Chairman Goodwin also stated that additional field surveys will be made on several areas in the Columbia River Basin in order to supply more complete data as to certain features of the pro-

ject. These surveys, he said, would be conducted during the coming summer.

It was originally planned by the commission appointed last year by the Secretary of the Interior to submit the report to Congress at the present session. The other members of the Columbia River Basin commission are Dr. Elwood Mead, Commissioner of the Bureau of Reclamation, and W. E. Weymouth, chief engineer of the Bureau of Reclamation.

New Electrical Code Discussed at Boulder Meeting

The new National Electrical Code and its relation to better wiring were stressed at a meeting of the electrical men in Boulder, Colo., April 25. Contractors, wiremen, city officials including the fire chief and building inspector, and representatives of the Public Service Company of Colorado attended the meeting.

The gathering was sponsored by F. S. Henderson, local manager of the central station company, who is a member of the wiring committee of the Rocky Mountain division of the National Electric Light Association. In such capacity he arranged for L. A. Barley, chief engineer of the Mountain States Inspection Bureau, and S. W. Bishop, chairman of the division wiring committee, to address the gathering.

Included in the recommendations for better wiring were the minimum standards of outlet connections recently issued by the national wiring committee. Similar meetings will be held in other Colorado cities during the summer.

COMING EVENTS

National Electric Light Association—

Annual Meeting—Atlantic City, N. J.
May 19-23, 1924

The Electric Power Club—

Absecon, N. J.
May 26-29, 1924

American Association of Engineers—

San Francisco, Calif.
June 11-13, 1924

Pacific Coast Electrical Supply Jobbers' Association—

Quarterly Meeting—Coronado, Calif.
June 12-14, 1924

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—

Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association

Annual Convention—Gearhart, Ore.
June 25-27, 1924

Seattle Electric Home Exhibit to Be Held in Fall.—The dates for Seattle's proposed annual electrical home demonstration and electrical campaign to be conducted by the Electric Club, have been set for Aug. 16 to Sept. 2, inclusive. A. J. Lutz, of the Pacific States Electric Company, has been named general chairman of all committees. Mr. Lutz will be assisted by Harry Byrne of the North Coast Electric Company, who has been named vice-chairman. Other committees will be named by Harry J. Martin, president of the Electric Club, when complete plans for the home and campaign have been formulated.

National Lighting Campaign to Be Aided by Denver Men

Plans for participation in the national lighting educational campaign are being made by the Electrical Cooperative League of Denver, Colo., although details of the campaign will not be announced until the National Electric Light Association convention is held at Atlantic City, May 19-23.

On receipt of the initial information concerning the contemplated campaign from J. E. Davidson, vice-president of the National Electric Light Association and chairman of the special committee, the advisory board of the Denver league commenced the foundation for later activity both in Denver and the mountain region.

Orders were placed with the Society for Electrical Development for copies of the monograph, "Building Residence Lighting Business" and these are now being distributed to every member interested in lighting in any manner. According to S. W. Bishop, executive manager of the league, this action will pave the way for a better personal understanding of the underlying features of the campaign by individual members when it is actually launched.

To tie in with the national activity, it is understood that the league, in the program for its new fiscal year starting July 1, contemplates another electric home, a model store lighting exhibit, and further emphasis on its educational work with architects and builders. A special committee consisting of F. F. McCammon, A. C. Cornell, H. D. Randall, and D. D. Sturgeon are busy at the present time outlining the plans.

Southern Colorado Power Company Representatives Meet.—A conference of local managers of branches of the Southern Colorado Power Company in eight towns east and west of Pueblo, Colo., was held April 21 and 22 in Pueblo when matters pertaining to the business of the company were discussed. Twenty-five out-of-town representatives of the company attended. The meeting was presided over by W. F. Raber, vice-president and general manager of the company. After the business sessions, the visitors were given an entertainment program including a tour of the company's property in Pueblo, theaters and automobile tours of the city, a bowling tournament, and a dance. Representatives from Canon City, Florence, Cripple Creek, Victor, Rocky Ford, La Junta and Ordway were present.

Street Lighting Subject of San Diego Electric Club Address.—Recalling to memory the changes in methods of street lighting in San Diego during the past 30 years, Bert Johnstone, city electrician, as chairman of the street lighting committee, gave the San Diego Electric Club a brief history of city street illumination at the April 29 meeting of that club. Figures on comparative lighting for the city were given by Mr. Johnstone. On April 21, 1923, there were installed and ordered for San Diego 611 ornamental standards and 1,063 overhead street lights. On April 21, 1924, there were 1,021 ornamentals installed or ordered, a 70 per cent increase, and 1,110 overheads, an increase of but 4½ per cent, showing a tendency toward more of the ornamental street standards.

Manufacturer, Dealer and Jobber Activities

The Globe Electric Supply Company of Denver, Colo., has been appointed distributor of the Eden Electric Washing Machine Company in the Rocky Mountain region, as the result of arrangements made recently by Fred Hazard, sales manager of the latter company. According to Paul Douden, manager of the Globe company, warehouse stocks are also being maintained by his company for the Illinois Wire & Cable Company, Sycamore, Ill.

J. Ludwig Hansen, representing the Pacific Electric Manufacturing Company, Inc., in Denver, Colo., has moved his offices from 215 Ideal Building to 409 Symes Building. Other accounts handled by his firm are Pittsburgh Transformer Company, Continental Electric Company, Industrial Products Company, and Electric Fuseguard Company.

Crouse-Hinds Company, Syracuse, N. Y., has distributed Folder No. 10, which is entitled "New Ideas in Electric Hand Lanterns." The folder contains description of the type VSB vapor-proof lantern for use wherever combustible vapor, gas, or dust is present. This lantern is designed for use with any lamp up to and including 75-watt size. A description of the type LM inspection lantern is also contained in the folder. This lantern is designed for use in railway coach yards, roundhouses and shops, freight transfer terminals, garages or other places where a strong, protected lantern is needed. A wire glass front is held against a gasket by a spring wire retaining ring in order to protect the lamp.

The Electric Contracting Company, one of the youngest contracting firms in Denver, Colo., has moved to a new location at 408 E. 20th Avenue, close to the business district.

Roller-Smith Company, New York, N. Y., has published Bulletin No. 10, April, 1924, which is a revision of the same bulletin dated July, 1923. The bulletin is devoted to Roller-Smith small size instruments for radio control panels. In the bulletin there appears a description of the new Roller-Smith type TD radio voltmeter, double range, 0-6 and 0-120 volts, which is intended for mounting on radio sets for the purpose of reading "A" and "B" battery voltage. The manufacturer claims that the particular feature distinguishing the voltmeter from ordinary double range voltmeters is that it incorporates a self-contained switch for the purpose of connecting the 6-volt range to the "A" battery or the 120-volt range to the "B" battery.

The Western Electric Company, New York, N. Y., has recently announced the offering of a complete new line of seven Davis flood lighting projectors. It is claimed that while this line is limited to but seven different types, the range covered is sufficient to meet practically all requirements in the flood-lighting field. The Davis line includes a new searchlight, beamlights and floodlights, and there is a small lighter weight unit for general utility purposes.

Curtis Lighting, Inc., Chicago, Ill., has recently inaugurated a direct-by-mail cooperative campaign with jobbers and dealers called "The Big Idea." The campaign is designed to help jobbers and dealers sell more X-Ray reflectors, wire, conduit, fittings, lamps, etc. Included in the material are a series of letters designed to be sent to jobbers' salesmen, dealers, and lastly "dealer to consumer" material.

Nollenberger & Dorner, Denver, Colo., contractors and dealers, have formed a baseball club to represent them in one of the fast semi-pro leagues recently organized in that city. The only other electrical team in the city is the championship Public Service Company nine which, because of its speed, is unable to schedule games with opponents of comparative caliber.

The Esterline-Angus Company, Indianapolis, Ind., has published Bulletin 424, which is devoted to showing some of the installations of the company's graphic instruments in sixteen of the twenty plants of the General Motors Corporation. Several interesting installations are shown in the bulletin.



Three of the wily golfers who defied the winds in the golf tournament at the Stockton meeting of the California State Association of Electrical Contractors and Dealers. Charlie Musladin, of Alexander & Lavenson Electrical Supply Company, helped Harry Woodward, of the Great Western Power Company, and winner of the cup, to bear up under the strenuous congratulations of Art Pierce of the Wholesale Electric Company.

The Hirschy Company of Duluth, Minn., has entered the washing machine field in Denver, Colo., with the establishment of a factory branch at 812 15th Street, which branch will be known as the Denver Zenith Washer Company.

Jewell Electrical Instrument Company, Chicago, Ill., has published the first issue of what is to be known as "The Jewell Magnet." The new house organ contains interesting matter concerning the activities of company men as well as information concerning the use of Jewell electrical instruments. According to the editor's announcement, the publication will be sent to friends of the company.

Norman Hicox, sales manager of Curtis Lighting, Inc., Chicago, Ill., announced in Denver, Colo., on his return from the Pacific Coast that his company, manufacturers of X-Ray reflectors, had perfected a new reflector to overcome daylight reflections in display windows that would prove a revelation to the electrical industry. He advised that no details would be given out by his company until shipments were started in the early summer.

The Bakelite Corporation, New York, N. Y., has had prepared a two-reel motion picture showing the method of manufacturing Bakelite. The film shows how the two basic materials, carbolic acid and formaldehyde, are obtained, as well as how these two substances are mixed to obtain the final product. The picture also shows a number of the uses of the new material in every-day life. The Bakelite Corporation has announced that it will loan the picture free to churches, schools and other centers of non-theatrical exhibition.

The Wm. J. Foley Company, 230 Fifteenth Street, Denver, Colo., distributors of house heating equipment, have added a line of electrical appliances. Among the accounts represented are the Coffee Washer, Ohio Tuec Cleaner, Grand Ironer, and the Minneapolis Heat Regulator. A retail branch has been established by the company in the Home Public Market.

Allen-Bradley Company, Milwaukee, Wis., has recently published four bulletins on its line of a.c. motor starters. The bulletins are well illustrated and contain descriptions of the various types of starters as well as illustrations of typical installations. The four bulletins that have just been published are as follows: Bulletin No. 600, "Allen-Bradley Alternating Current Resistance Starters"; Bulletin No. 640, "Allen-Bradley Type H-1852 Semi-Automatic Resistance Starter"; Bulletin No. 720, "Allen-Bradley Type J-1552 Across-the-Line Starting Switch"; Bulletin No. 740, "Allen-Bradley Type J-3052 Automatic Resistance Starter."

The General Electric Company has recently published sheet No. 66021, which describes the General Electric single watt-hour meter indoor current transformer. The transformer is designed for circuits up to 4,500-volt, 25-60 cycles, and is known as type L-3. The mechanical features of the transformer are fixed secondary terminals, mounting base arranged for either pipe or wall mounting, and uniform dimensions for all sizes between primary bolt holes and in height of primary terminals from mounting base. Uniform dimensions of all sizes permit the substitution of a transformer of one capacity for one of another capacity without the necessity of altering the primary wiring. The polarity is indicated by white markings on the primary and secondary terminals. Both dimensions and ratings of the L-3 current transformer are presented on the descriptive sheet.

Max Rosenthal of Williams & Rose Electric Company, Denver, Colo., has purchased the stock and selling rights of the X-Cel-All Master-Lite Company of Colorado from Lawrence & Griffling. Mr. Rosenthal expects to establish a separate department in his old business for handling this line of commercial lighting units.

Personals

Herbert J. Flagg, for four and a half years chief engineer of the State Department of Public Works at Olympia, Wash., has resigned to become assistant manager of the Grays Harbor Railway & Light Company in Aberdeen, Wash., taking up his new duties on May 1. Mr. Flagg is a graduate of the University of Washington School of Engineering, and following graduation in 1912, entered private practice at McMinnville, Ore., where he became assistant city engineer. He was also city engineer for the towns of Dallas and Hillsboro.



HERBERT J. FLAGG

He entered the service of the state in 1915 as assistant engineer under T. E. Phillips. During the war he served as captain of the Coast Artillery, and was later transferred to Fort Monroe, as instructor in Coast Artillery School. Mr. Flagg will have charge of the extensive improvements which will be made by the Grays Harbor Railway & Light Company, involving the expenditure of more than \$500,000 in improving the power plants of the Grays Harbor district.

J. L. Phillips, formerly connected with the Atlanta, Ga., office of the Okonite Company, has been appointed Pacific Coast manager for the company, with headquarters in San Francisco. The Okonite Company's district offices are at present in the Call Building, but on and after June 1 they expect to be located at 754 Monadnock Building, San Francisco.

Martha E. Dressler, instructor in the home economics department at the University of Washington, Seattle, Wash., was recently the honor guest and principal speaker before The Electric Club of Seattle.

Glen E. Arbogast, president of the Newbery Electric Corporation, Los Angeles, Calif., has been elected first vice-president of the newly organized California State Builders' Association. It is estimated that the members of this organization control an expenditure of more than \$365,000,000 in building construction per year.

Oliver T. Erickson, former city councilman of Seattle, Wash., and author of the Erickson superpower bill, and Norwood Brockett of the Puget Sound Power & Light Company, also of Seattle, recently participated in a debate on the power question at a special meeting of the Seattle Credit Men. The former presented the municipal ownership side, and the latter that of the public utilities. Each speaker was allotted thirty minutes to discuss the question.

Z. E. Merrill of Albany, Ore., assistant general manager of the Mountain States Power Company, and A. L. Martin, Marshfield manager for the same company, were recently in Bandon where they met with the city council in regard to supplying the city with electric service. The city has already received bids on a standby plant of about 200 hp. The power company proposes, instead, the building of a transmission line into Bandon from Beaver Hill. Action will be deferred until a more careful consideration of the two propositions can be made.

J. G. Keegan, local manager of the Cheyenne Light & Power Company, Cheyenne, Wyo., a subsidiary of the Public Service Company of Colorado, is one of the principal directors of the 28th Annual Frontier Days celebration in that city. The show will be staged July 22-25 and Mr. Keegan will have charge of the Indians, decorations, and music.

Ely C. Hutchinson, vice-president and general manager of the Pelton Water Wheel Company, San Francisco, Calif., is spending a month at Philadelphia, Pa., and New York City on business for his company.

G. H. Froebel, manager of the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., was a recent Seattle, Wash., visitor.

U. G. Jackson, ex-city engineer of Kelso, Wash., has been engaged by the American By-Products Company to make ground surveys of the company's site of 1,000 acres of land near Kelso. It is proposed to establish a large factory employing several hundred people.

C. H. Pendleton, who has been connected with the sales department of the Pacific States Electric Company of Los Angeles, Calif., for a number of years, has just recently joined the California Street Lighting Sales Company as sales manager.

Robert ("Bob") Edwards, of Edwards & Company, Inc., New York City, is visiting the Pacific Coast in the interests of his firm. Mr. Edwards has already spent some time in Los Angeles and San Francisco, Calif., and has left for the Northwest.

A. C. Cornell, manager of the Western Electric Company; John J. Cooper, manager of the Mountain Electric Company; Guy B. Hopkins, auditor of the Public Service Company of Colorado; George E. Lewis, executive manager of the Rocky Mountain Committee on Public Utility Information, and S. W. Bishop, manager of the Electrical Co-operative League, are among the Denver, Colo., electrical men who will attend the convention of the National Electric Light Association at Atlantic City, N. J., May 19-23.

George Boring, of the Pacific States Electric Company, Portland, Ore., was a recent visitor to San Francisco, Calif., on business for his company.

C. S. Peterson, illuminating engineer of the Treasury Department, while inspecting the federal buildings in Denver, Colo., recently, addressed the commercial department representatives of the Public Service Company of Colorado.

R. G. Gentry, commercial manager, G. W. Fallor, assistant vice-president, H. H. Kerr, electrical superintendent, M. McK. Koch, electrical engineer, Carl Luscombe and L. W. Cody, of the Public Service Company of Colorado, Denver, Colo.; Fred Norcross of the Home Gas & Electric Company, Greeley, Colo., and E. A. Phinney of the Jefferson County Power & Light Company, Golden, Colo., will attend the National Electric Light Association convention at Atlantic City, N. J.

George W. Bixler, director of publicity and public relations for the Public Service Company of Colorado in Denver, Colo., will serve as a delegate from the advertising bureau of the Denver Chamber of Commerce at the international convention of the Advertising Clubs of the World to be held in London, England, in July.

A. M. Frost, manager of the commercial department of the San Joaquin Light & Power Corporation, has left for Atlantic City, N. J., to attend the annual convention of the National Electric Light Association.

H. E. Sandoval, manager of electric sales of the Pacific Gas and Electric Company, San Francisco, Calif., has left for Atlantic City, N. J., to attend the annual convention of the National Electric Light Association.

H. H. Allison, for some time illumination sales engineer of the Pacific Gas and Electric Company, San Francisco, Calif., has resigned from that company to become associated with the National Lamp Works of the General Electric Company, Oakland, Calif.

S. E. Gates, Spokane, Wash., manager of the General Electric Company, has been appointed manager of the Los Angeles, Calif., office and left for that



S. E. GATES

place on May 5. Mr. Gates has been in charge at Spokane for fourteen years and has been very active in civic affairs—particularly in the activities of the Spokane Chamber of Commerce. During the year 1923 Mr. Gates was chairman of the Industrial Bureau and carried through a very successful program of activities.

W. E. Ahrens, Seattle, Wash., has been appointed division plant engineer of the Pacific Telephone & Telegraph Company for the State of Washington, succeeding R. Z. Young, who goes to San Francisco to assume a new post with the company. Mr. Ahrens has been outside plant engineer, with supervision over all the outside construction and maintenance work of the company in the state. He came to Seattle in 1908, and has been with the company since that time in the engineering department. He will be succeeded by O. E. Mong, who has been transmission engineer for the company since 1910. F. D. Carroll succeeds Mr. Mong as transmission engineer.

Albert Slocum Terry, supervisor of the lamp laboratories of the General Electric Company, was a visitor to San Diego, Calif., recently, spending his vacation in that locality.

J. M. Hooper, of the Rainier Electric Company, and secretary of the Electric Club of Seattle, on May 2 was elected president of the Fraternal Order of Eagles, Aerie No. 1, and after June 2 will be the active head of the largest Aerie in the United States.

Charles A. Semrad, assistant general manager of the Public Service Company of Colorado with headquarters at Boulder, Colo., has been elected president of the Rotary Club of that city for the coming year.

Ray W. Turnbull, Northwestern representative of the Edison Electric Appliance Company, Chicago, Ill., has been made assistant Pacific Coast sales manager of that company. Mr. Turnbull was born and raised in New Haven, Conn., and entered the electrical business in Pasadena, Calif., in the employ of the Southern California Edison Company. Some time later he joined the staff of the Pacific Electric Heating Company (predecessor of Edison Electric Appliance Company) at Ontario, Calif. Early in 1911 he became affiliated with the General Electric Company as electric heating specialist working out of the San Francisco office. Shortly

R. B. Williamson, electrical engineer in charge of alternating current design of Allis-Chalmers Manufacturing Company, sailed April 26 for a two months' trip to the British Isles and the Continent. During his trip Mr. Williamson will inspect European engineering developments and will attend the British Empire Exposition at Wombly.

W. C. Sears, sales manager, electrical department, Western division, of Landers, Frary & Clark, New Britain, Conn., is making a tour of the Pacific Coast. He has already visited Los Angeles and San Francisco, Calif., and will take in the cities of the Northwest before returning to the factory.

Frank N. Cooley, former sales manager of the Western Electric Company in Seattle, and now manager for that firm in Duluth, Minn., has organized a club of electrical dealers and contractors in that city, of which he has been elected president.

T. E. Bibbins, president of the Pacific States Electric Company, San Francisco, Calif., has been elected a director of the newly organized Pacific National Bank in that city.

A. E. Tregenza, formerly sales manager of Economy Fuse Manufacturing Company, Chicago, Ill., has recently gone with the Chicago Fuse & Manufacturing Company, also of Chicago, as assistant to the president, in charge of commercial relations.

G. H. Froebel, manager marine department, and W. E. Phau, general engineer, of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., are spending several weeks in Los Angeles, Calif., territory in the interests of their company.

Norman B. Hickox, sales manager of Curtis Lighting, Inc., Chicago, Ill., recently spent several weeks in Los Angeles and southern California in the interest of his company.

W. W. Weir, designing engineer of the Majestic Electric Development Company of San Francisco, Calif., recently spent two weeks in Los Angeles and southern California, looking after installations and new business in the interests of his company.

H. A. Cordes, formerly with the Southern California Edison Company in the Big Creek division, has recently joined the General Electric Company in their Los Angeles, Calif., office. Mr. Cordes graduated from the University of Southern California in 1919 and then went to Schenectady, New York, where he took the apprentice course of the General Electric Company at their factory. After the completion of his course he returned to California in 1921, and went to work for the Southern California Edison Company.

L. M. Watson, central station division, Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., is on a trip to the factory of that company at Pittsburgh, Pa. While East he will visit the New York and Philadelphia offices of the company.

L. A. S. Wood, director of the Illuminating Engineering Society, and inventor of a new system for distributing light in equal proportion to all parts of the street, conserving light now wasted and eliminating glare, spent several days in Salt Lake City, Utah, and Ogden recently, demonstrating his improved lighting arrangement.

Obituary

Colonel H. M. Byllesby, president of the Byllesby Engineering and Management Corporation—parent organization of the Western States Gas & Electric Company, the San Diego Consolidated Gas & Electric Company, the Coast Valleys Gas & Electric Company, the Northern States Power Company, and of other utility companies—died suddenly on May 1. Colonel Byllesby had a spectacular career from the time he left Lehigh University and was one of the foremost figures in the utility field. His early experience included employ-



COLONEL H. M. BYLLESBY

ment by Thomas A. Edison, with whom he maintained a close association throughout his entire activity. In 1885 Colonel Byllesby was made a vice-president of the newly formed Westinghouse Electric Company and in 1889, at the age of thirty, he was sent to Europe to represent Westinghouse interests. During the early 90's he was head of a large electrical supply house with headquarters at St. Paul, Minn. Later activities included central station construction and management in Oregon, Montana, California and other states. During the war he served in the Signal Corps and, later, as chief purchasing agent for the A. E. F. in Great Britain and Scandinavian countries. For this and other meritorious services he was awarded the Distinguished Service Medal. Despite the many great honors bestowed upon him Colonel Byllesby was extremely democratic in his personality and was unusually popular among his employees.

Tully Scott, former chief justice of the Colorado Supreme Court and more recently a member of the Public Utilities Commission of that state, died in Denver, Colo., May 4, after an intermittent illness of several years' duration. Mr. Scott was well known to the utility and electrical men of the mountain region and especially in Colorado where his decisions were always regarded as fair and impartial.

J. W. Lawson, one of the charter members of the Edison Pioneers, an organization of men who worked with Mr. Edison in the early experimental days at Menlo Park, N. J., died in San Diego, Calif., April 29.



RAY W. TURNBULL

after this he was transferred to the Portland, Ore., office in the same capacity and remained on that work until the outbreak of the war. In 1917 he entered the army and earned a commission in the aviation corps. After the war Mr. Turnbull joined the staff of the Edison Electric Appliance Company, having direct supervision over the Northwest.

Trade Outlook

San Francisco

In San Francisco and the territory tributary to it business conditions are fair, although there is apparently a tendency toward lessened activity. This is believed to be due in part to the effects of the hoof and mouth disease quarantine and the consequent embargo on shipments of fruits, vegetables and other products, with resultant reduction in prices. However, conditions in this connection are expected to improve materially, as the ban on many sections has already been lifted, and the removal is continuing as rapidly as quarantined sections are reported free from infection.

Agricultural conditions throughout the state also naturally affect San Francisco business. In several sections the drought has been severe, and the crop outlook, particularly that of hay, is not promising. This, of course, is reflected in retarded buying, and wholesalers of shoes and men's furnishings report little movement.

There is continued activity in building, with marked increase in the number of homes being constructed in outlying residential districts, and a steady erection of modern apartment houses.

Money is plentiful, with rediscount rates quoted around 4 per cent. Collections are reported fair. Labor seems to be well employed at good wages, but some unemployment is noted among the unskilled class.

Los Angeles

There has been a general change for the better in the electrical business both in retail and wholesale lines, retail business having picked up just prior to Easter, and sales are most favorable for this period of the year. There is a decided optimistic outlook from the wholesalers, who, while not getting all the business that they had anticipated for this year, are enjoying a profitable business.

This fact is borne out by the building permits which reveal about an even break with the same period a year ago, the number of permits issued for the period April 15 to 30, 1924, being 2,084 with a valuation of \$7,306,585 as compared with 2,650 permits having a valuation of \$7,901,512, for the corresponding period of last year. Radio sales have shown a decided improvement in the past month and bid fair to continue.

The foot and mouth epidemic which has caused serious losses in Los Angeles and throughout California is under control and this has resulted in a lifting of the quarantine restrictions so that salesmen are able to travel about freely, which helps considerably. The rains of last month came at an opportune time and, on the whole, there is a decided undertone of conservative optimism.

Portland

Business in Portland and vicinity is in a prosperous condition. April figures now available show that bank clearings, building permits and lumber exports all

showed gain over March, 1924, and April of last year.

Building continues at a good rate. Construction of a 12-story building to cost \$1,000,000 was recently announced by A. M. Bedell of New York. Homes and residence building lots are much in demand and "for rent" signs scarce.

Portland's lumber business has experienced a temporary setback. Production remains about 10 to 12 per cent above normal. There has during the last few weeks been a further slackening of orders and shipments. In spite of all this, actual shipments of lumber during April were slightly heavier than April, 1923.

The most disturbing elements in the business life of Portland at present are the effects of the epidemic and drought in California. Portland and Oregon are dependent on California for many staple articles and the quarantine has seriously affected shipments.

Collections are not improving and there is some idle labor because of slowing up of the lumber business.

Salt Lake City

While the "between-seasons" quietness is apparent in some lines of business, there is a generally healthy tone. Building activity maintains a steady increase.

In the agricultural districts it is expected sugar beets will bring good returns this year and that pea raisers and tomato growers will do well. The wool men are prosperous, and the cattlemen are getting into a better position. Three years ago the canners were in distress; present conditions would seem to indicate that this year they will be on a more substantial basis than has been the case up to this time.

Wage increases of 25 cents per day have been announced by the Utah Copper Company at its Bingham mines and its mills at Magna and Arthur. Similar increases have been announced at the plants of the International Smelting Company, the United States Smelting, Refining & Mining Company, and the American Smelting & Refining Company.

Denver

Out of a total of 65,000 habitations, there are but 1,207 vacant houses and apartments in this city, according to the books of the Public Service Company of Colorado. This is less than two per cent and constitutes the best record since world war times, leading realtors state. It is considered one of the basic factors responsible for the continuing building boom as shown by the comparative figures for 1923.

Building permits for the first four months of the present year exceeded the same period a year ago by about \$1,017,700 and the total for April amounted to approximately \$2,416,650. House and apartment house construction is primarily responsible for the major part of the building program.

Retail purchasing has not picked up to the extent anticipated early in the year. In electrical lines, however, a fair volume of appliances is moving. Those electric shops handling radio equipment are leading the field in sales of appliances. An early start is being given to the campaign on electric fans this year as local dealers look for a good volume of sales, judging from early season inquiries.

Considering all basic factors, business in Denver is regarded as good notwithstanding the pessimistic aspect held in some lines.

Spokane

The abnormally early spring has had the usual consequences of late frosts and little rain. The apple crop at Walla Walla has been damaged severely by heavy frosts, and the prune crop also to some extent. In the Lewiston district it is estimated that cherries have been damaged twenty per cent by frost. Throughout the Inland Empire rain is needed; with rain during the next two months a bumper wheat crop should be obtained. Already ten per cent of the winter wheat at Ritzville has been reseeded. The irrigation districts in Spokane Valley are beginning to use their pumps, although facing at the same time the possibility of further frosts.

Another rich silver strike near Bayview, Idaho, and a new rich seam of copper, silver and lead near Colville, Wash., are reported.

In general, the territory may suffer some reverses this year due to crop failures, but in other respects the prospects are so bright that sustained optimism is justified. All the manufacturing plants of Spokane, with but few exceptions, are working at good output. Retail, wholesale, and jobbing lines report business conditions on the whole as being better than a year ago.

Seattle

General business conditions in the Puget Sound territory are reported satisfactory, with prospects for the summer trade bright. A slight decline in some lines of retail trade is noted, but this is not expected to continue, and volume of business is holding up well.

Lumber conditions are uncertain, with further shutdowns in lumber manufacturing plants predicted in some quarters. Commercial logging operations have been reduced, and some price cuts have been announced. About half of the new business taken during the past week or ten days was for water delivery, although new business for rail shipment is increasing.

Construction work is continuing in good volume, especially in residence work, with a large volume of small building under way. Real estate operators report a continued tendency of buyers toward better homes, particularly as regards electrical equipment. Some dealers report that it is difficult to sell a new home that has not been wired for electric equipment, particularly for range.

Household equipment has received decided impetus during the past three months, and dealers believe that this will be an unusually good year for ranges, washers, vacuum cleaners and smaller electrical devices.

Journal of Electricity

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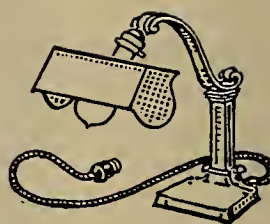
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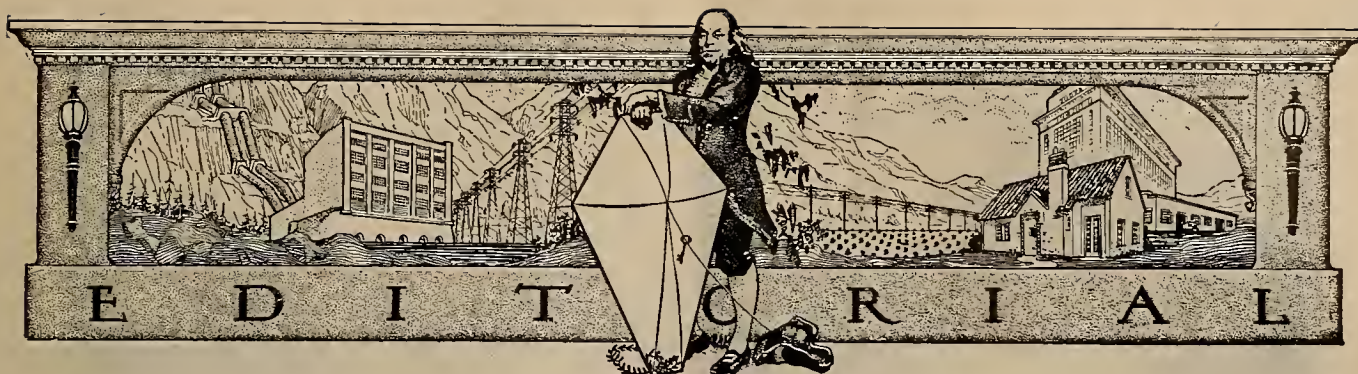
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Co-ordination and Cooperation

EVERY year at this time it is the privilege of the Journal of Electricity to publish the committee reports of the Pacific Coast Electrical Association. Two or three weeks prior to the convention, copies of the Convention Report Issue are placed in the hands of every member of the Association, so that ample time is afforded for study and the preparation of discussion to be presented at the various section meetings. Thus papers are read by title only, and all of the time allotted to each committee session is given over to the interchange of ideas brought out in discussion, an advantage of considerable consequence to the convention itself, and to the industry as a whole.

INDUSTRIAL conventions are becoming more and more a factor in our business lives. As we develop mentally, as we progress in our material affairs, specialization on the part of the individual worker and consolidation of lesser into greater industries increase proportionately. The electrical engineer, as such, is still with us, but he is a specialist in some subdivision of the profession, rather than a general practitioner like the family physician of a generation ago. The central station that a comparatively few years ago served merely a small community, now, due to a combination of economic pressure and the evolution of events, numbers its employees by the thousands and its

capacity in hundreds of thousands of kilowatts.

ON the one hand, is the individual whose scope of activity is narrowed more and more as it becomes confined to a single one of the countless problems of industry; on the other, his organization that is growing greater and greater in size as the years slip by. In this contrast lies one of the interesting phenomena of our industrial development. The problem confronting the executive is how to effect a real co-ordination of effort among an army of specialists, how to bring to each individual a sense of responsibility to the others, and an intelligent understanding of the effect of his work on the industrial structure as a whole.

THIS is the real function of the convention, which is merely an enlarged conference, after all. The day has passed forever when one man can be the whole show. No man, however great he may be or thinks himself, can be anything other than helpless without the aid of many others. Industry owes much, civilization owes much, to such institutions as the Pacific Coast Electrical Association, whose labors are dedicated to the accomplishment of real co-ordination, cooperation and the molding of the many individuals into a harmonious whole for the greater service of mankind.



CORONADO, Calif., has been selected as the 1924 convention city of the Pacific Coast Electrical Association. In the center is an airplane view of the city showing the yacht harbor, tent city, Hotel Coronado and in the background North Island air station and the golf links. Above at the left is a view of the hotel grounds; at the right is a scene in Balboa Park, San Diego. Below is a view of the new city substation of the San Diego Consolidated Gas & Electric Company. Delegates to the convention will visit this station.

Selling Electricity for Industrial Heating

By E. J. CIPPERLY*

THE application of heat materially affects cost and quality of practically every article manufactured today. In the past this important subject has received far too little attention by the industrial executives, and the possibilities of industrial electric heating often have not been given serious consideration.

The tendency on the part of most people has been, and this is still quite prevalent, to look only at the B.t.u. cost, when considering the use of electric energy for industrial heating, and from that standpoint, the extended use of the latter would be hopeless. The solution of the problem lies in selecting those processes where electric heat can be applied in such a manner that the total cost of the finished product is reduced, production is increased, or the quality is improved to an extent which will offset the higher cost of electric energy or results are attained that are impossible to secure with fuel.

It should always be kept in mind that on a given article the cost of the heating process through which it passes is, generally speaking, only a small part of the total cost of production of that article and, therefore, a slight increase in the cost of the heating process has very little effect on the cost of the manufactured article.

However, there are other advantages gained where electric heat is correctly applied, some of which can be measured in dollars saved, and others of a more or less intangible nature, the value of which is hard to measure. Examples of the former are the elimination or reduction of rejects, reduction of fire hazard, lower maintenance expense, less attendance, economy of floor space, reduction in power rate for other purposes, saving in first cost of piping, chimneys and ventilators, and other results which directly affect a reduction in the cost of labor operations through which the product later passes. Examples of the intangible savings are elimination of the personal factor, improved working conditions and convenience and cleanliness, resulting in more efficient labor.

A specific example of indirect saving resulting from the application of electric heating may be cited as follows:

A manufacturer of screws and tacks in drawing wire, annealed the latter between draws, after which it was necessary to pickle the wire, dip it in lime to counteract the acid, and then dry it in ovens heated by natural gas preliminary to the next draw. He electrified his ovens with the following results. He was able to dry out in three electric ovens an amount of wire which had formerly required the use of seven gas ovens, but further it was found that when drying in the electric oven, the lime on the wire did not form a hard glaze as it had in the gas ovens, and the resultant saving in wear of drawing dies, together with the increased production, gave a lower cost per ton although the electric energy cost more than the gas.

Many data have been published in the trade journals during the past few years relating to the use of electric ovens for japan baking; the repetition of some of these figures may be of interest. The manufacturers of automobiles are probably the largest users of japan in any one class of industry and they are, of course, vitally interested in such factors as cost of manufacturing, rate of production and quality of finish. The Chandler Motor Company found electric jappanning ovens operated on a rate of 9c per kw. hr. about 20 per cent cheaper than ovens using natural gas at 30c per thousand cu. ft.

Tests made on two double ovens, one gas and the other electrically heated, showed the following results:—

Parts for 210 cars were baked in the gas oven with 18 per cent rejections—parts for 498 cars were baked in the electric oven with 3 per cent rejections. In other words, the electric oven gave over twice the output with one-sixth as many rejections.

Among other automobile companies using electric japan ovens such as Chevrolet, Grant, Peerless, Jordan, Maxwell, Packard and McCord, the rates paid for electric energy compared as follows with the rate of gas available:—

ELECTRICITY	GAS
2.4 c	80c
2.41c	35c
1.49c	35c
1.99c	35c
2.2c	49-79c
1.25c plus demand	59-79c
1.25c plus demand	49-79c

One automobile company reported baking in fifteen electric ovens in 9 hours, the same number of automobile bodies as were baked in another plant in twenty-four gas ovens in 12 hours, the ovens being of the same size in both cases. Put another way, 135 electric oven-hr. equalled the productions of 288 gas oven-hr.

A foundry company installed electric equipment in its core ovens and reduced the baking time one to three hours under that required with gas firing at 350 degrees F., which was the highest practical baking temperature with gas heating. The efficiency obtained with these ovens is from 10.9 to 14.5 lbs. of green cores baked per kw.-hr. consumed. In one week using four ovens 108,730 lb. of cores were baked with an energy consumption of 9,389 kw.-hr. or 11.6 lb. per kw.-hr.

Annealing glass X-ray tubes in an electric lehr resulted in a 20 per cent reduction in the overall cost of production as compared with the gas heat lehr. This saving is equivalent to seventy-five times the cost of the electric power used.

A manufacturer of enameled metal ware, who had used various fuel heated furnaces for firing vitreous enamel, installed an electric furnace of the metallic resistor type and after using the latter for several months, the superintendent reported as follows:—

"The results thus far obtained have been highly satisfactory particularly with regard to the quality of the output and the speed with which the furnace can be brought to temperature. The electric furnace can be brought from cold to 1,700 degrees F. in twelve hours. A coal furnace would require about three days, an oil furnace 24 hours and a gas furnace 16 to 20 hours.

"It is necessary to employ an expert fireman to keep the temperature at 1,700 degrees F. in the coal furnace and at times wind and atmospheric conditions make it impossible. But the most serious difficulty is with the muffle which periodically sags and breaks with resultant damage and loss of ware. The muffle must be renewed at intervals of two to twelve months, entailing a shut down of two to four weeks. Furthermore, with the coal furnace, the sulphur fumes are injurious to the ware and frequently cause a high percentage of seconds or job lots. The same drawbacks are experienced with oil and gas furnaces."

Automobile manufacturers are using the electric furnace for heat-treating crank shafts, axles, gears, drive shafts, springs, wrist pins, connecting rods, and cam shafts. They have found that ring gears passed through the electric furnace are not only of uniform hardness, but are free of warpage, such as is experienced with fuel heated furnaces. One manufacturer reports he has never had occasion to use his straightening machines.

Complete data are not available but it is estimated that the present connected load of industrial heating devices for temperatures up to 2,000 degrees F. is 400,000 kw.

Equipment is suitable for heating furnaces operating at temperatures up to 2,000 degrees F. The principal operations which are performed in the furnaces of the metallic resistor type are hardening, tempering, annealing, normalizing, carbonizing and baking vitreous or porcelain enamels. Electric furnaces of this type are being used for annealing brass, copper, aluminum, steel castings and various alloys and glass. They are being used for heat treating, i. e., hardening and tempering steel articles ranging from the ribbon spring which forms the motive power of the talking machine up to gun forgings weighing over 300,000 lb. The field of heat treating is very broad, practically every manufacturer who produces articles containing steel parts must have equipment for heat treating the latter.

The baking of vitreous enamel likewise takes in a large field as will be apparent upon considering the large number of articles in daily use which have an enamel covering.

*Sub-Committee on Industrial Heating: E. J. Cipperly, chairman; W. W. Hicks, R. C. Griffin, T. A. Reed, E. A. Wilcox, C. B. Merrick, Harry Kennedy, C. W. Curtis, F. O. Seiviers.

The principal operations which are performed in ovens of sheet metal construction are core baking, drying, enameling, evaporating, japanning, roasting and tempering. Temperatures used for this class of work rarely exceed 700 degrees F.

The extent and rate of development of industrial electric heating will depend on the manufacturer of electric heating equipment, the central station and the local heating engineer. The increasing use of electricity for industrial heating makes it necessary that the men of these branches of the electrical industry know as much about the apparatus available and its application as they know about motors and lamps, which constitute the main load now carried by the central station. But it has been predicted by men of foresight that the industrial heating load will in a short time exceed that of the lighting and motor load combined. Industrial executives and engineers approached on the subject of electric heating, by power and sales engineers properly informed, will eventually think in terms of electric heat instead of other fuels that have been used in the past with all their disadvantages.

The industrial heating load is a very desirable load for central stations, and these companies should not overlook the possibilities offered and should have men in their organizations well informed on this subject.

Electrically Heated Cooking and Baking Equipment

By P. H. BOOTH*

IT is in its application to the industries that electricity has found its greatest field. One of the more recent developments in this industrial field is the utilization of electric current for commercial cooking and baking. Electricity, in an industrial sense, is some forty years old, but people have been so busy applying it to illumination, machinery and vehicles, that its wonderful capabilities as a producer of heat for cooking and baking have only been recognized during the last eight or ten years. The development in applying electric heat to what is known as heavy duty kitchen and baking equipment has naturally made the greatest progress where the energy charges are such that this application is practical and economical from the user's standpoint.

The Pacific Coast states, especially the State of California, has enjoyed a very low electric energy rate for a number of years, due to its tremendous hydro-electric power development. California, for instance, shows approximately 50 per cent of its industry electrified and the saturation increasing rapidly every year. Here we find the electric bread baking oven, the electric heavy duty range and many other items in commercial cooking equipment fast superseding fuel and gas types of equipment. These installations always breed success and satisfaction wherever placed and the users are always hearty endorsers of their equipment. There are so many advantages and compensating factors entering into the use of the electrically heated equipment that every day the user discovers some new saving, some improved working condition for his plant where electricity has solved the problem to make his bake shop or kitchen the last word in modern progress and development.

The electric heavy duty equipment allows the utilization of space heretofore not adequate for gas or fuel type equipment. The electrically heated units can be placed in any part of the building from the basement to the top story or in any remote interior location without disastrous effects to other parts of the building. There are no soot or grease deposits resultant from electric cooking. Electric cooking means a clean kitchen with pure air and healthy working conditions with only a limited amount of ventilation. Smoke flues and extra vents can be eliminated in new construction. Fuel storage is done away with. There is no firing or removing of ashes—consequently, less dirt and dust so prevalent with fuel type equipment. There are no explosions with the electrically heated units and fire hazard is greatly reduced. Insurance rates can be reduced eight per cent for the entire building where all electrical equipment is installed.

Next in importance in laying out or planning of the kitchen or bake shop, we find the utilization of floor space a most important factor on account of our rapidly increasing construction costs and here is where the electric equipment saves the user a very appreciable amount. Electric equipment has greater capacity per square foot of floor space used than any other type of equipment. We know that on one line of electric bake oven equipment, which is so successfully used in this field, that the capacity per hour runs approximately 50 per cent higher than the same rating of gas and coal equipment which the electric replaced.

To the user of electrical equipment there are many compensating factors which can be measured in a dollars and cents way and which are of the utmost importance. One of the most important factors is the saving in shrinkage in products baked electrically. It has been proved that $\frac{3}{4}$ of an ounce of dough is saved in baking one pound loaves of bread in a certain multiple deck type electric oven. All products baked electrically show a proportionate saving in shrinkage. Another important phase of the electric baking is less spoilage and the freshness retained in baked products for a longer period of time. Electric baking is always uniform, producing 100 per cent salable products at the top price.

In the electric heavy duty range we find the greatest improvement over any fuel type equipment through the development of cast-in helical core hotplate units for the cooking top. Here we find the demands of the most exacting chef met in a superior manner. This range cooking top is divided into four sections of four hotplates independently controlled with three heat switches for each plate. Each hotplate section can be readily heated to the hot spot temperature without heating the entire range. The helical core cast-in unit being the only unit which withstands the heavy duty service in a hotel kitchen—never warps or cracks. There is no distortion after heating to the hot spot temperature and quickly going to a low simmering temperature. This means an always level cooking top and increased efficiency for all surface cooking operations. It means that the chef can make his kitchen pay. It has solved the problem for the management in this respect.

The more important advantages cited by the users of electrically heated apparatus in general, compare favorably with those cited below and which are claimed for the electrical equipment:

- 1—Better and more uniform quality of product
- 2—Saving by less shrinkage
- 3—Goods baked electrically retain their freshness for a longer period, thereby reducing losses due to stale product
- 4—Saves $\frac{1}{2}$ to $\frac{2}{3}$ the floor space required for fuel fired oven.
- 5—Eliminates the often difficult and expensive problem of a furnace chimney
- 6—No labor to handle fuel or ashes
- 7—Eliminates constant provision for fuel
- 8—No dirt or dust from fuel
- 9—Can be installed on any floor of a building without bringing up the fuel handling problem
- 10—More uniform deck temperature
- 11—More accurate and flexible control of temperature
- 12—A reduction in most cases in insurance rates can be obtained for entire buildings in which complete electric heating apparatus is used instead of fuel fired apparatus.

Architects and builders particularly favor this later development in applying electric current to cooking and baking equipment as it materially assists them in their layouts and floor plans. There are a great many places where ordinances will not allow gas equipment to be used. Electricity has also solved this problem.

Where once used the electric heavy duty equipment is always favorably endorsed. The user knows that it has a great deal to do with the success of his hotel, restaurant or bake shop. It means the highest class cooking and baking for his establishment. Properly cooked food and properly baked products mean satisfied patrons. This news travels fast and is the best advertising a man can buy—the word of mouth advertising from pleased patrons. Poorly prepared food has just the opposite effect and creates a reputation hard to live down. That is why we can point to the users of electrically heated heavy duty equipment as being successful business men. There are no failures among them.

Architects and builders should profit by the experiences obtained where the electric equipment has been put to use and has so ideally served the hotel, restaurant or baker, the hospital, the school and the public institution. We are all interested in successful enterprise and there are no bounds to the wide diversity of the use of electric energy.

*Sub-Committee on Heavy Duty Equipment; P. H. Booth.

The Sale and Application of Electric Water Heaters

By J. M. MORRIS*

THIS year is the first in which a separate sub-committee on electric water heating has functioned.

Unfortunately it was not possible for the committee to meet frequently enough to accomplish results that would otherwise have accrued from a more detailed study of this subject. Certain subjects, however, were discussed at the meetings which have general interest and which are contained in the following report.

Method of Increasing the Sales of Electric Water Heaters

It was felt by the committee that at the outset of the study under this heading it would be advisable to analyze the users of water heaters, grouping them according to certain classifications as follows:—

a. **Domestic Application.** This to include application of electric water heaters for residences.

b. **Group Domestic Application.** This to include application of electric water heaters to apartment house installations, bungalow courts, etc.

c. **Commercial Application.** This to include the application of electric water heaters to restaurants, film companies, barber shops, soda fountains, physicians, beauty parlors, etc.

d. **Industrial Application.** This to include the application of electric water heaters to manufacturing plants of all kinds.

Commenting on the classifications mentioned above the following facts are of interest. Considering the matter of domestic application for electric water heaters, the aspect of this phase of the business has remained, as in the past, the most important application for electric water heaters. During the year just completed numerous central stations carried on active campaigns among their customers, pointing out to them the advantages of electric water heating, and these campaigns resulted in considerable success. The point to be remembered in this connection is that, although the demand for electric water heaters on the part of the public is increasing, due to the increased use of these devices, nevertheless there is still considerable missionary work which must be carried on continuously toward increasing the popularity of electric water heaters.

Under the heading of "Group Domestic Application," a number of very large installations were made during the last year. One of these installations involved a total of seventy-six automatic heaters installed in a group of flat buildings in the city of Los Angeles.

Under the heading of "Commercial Application," there continues to be a demand for numerous special applications of electric water heaters in connection with restaurants, barber shops, etc.. These various applications would be too numerous to list in this report. A large number of these applications involve specially designed heaters.

In connection with "Industrial Application," we are not aware of any particular large application to include in this report.

Merchandising Channels.

Concerning methods of increasing the sale of electric water heaters, a study of the merchandising channels through which water heaters are being sold today would indicate that these channels are as follows named in order of their importance under present conditions in the State of California.

- 1—Central stations.
- 2—Electric dealers.
- 3—Apartment houses.
- 4—Industrial applications, including mines, industrial plants, etc.
- 5—Plumbers.

Distribution from the manufacturers through these various sources may be through a jobbing house or not, depending upon conditions.

As a first recommendation it is suggested that the list of distributing agencies mentioned above be studied over and that it be determined whether or not this list

covers the situation or whether other means of distribution should be developed. It was suggested that the water heating and range committee give some thought to this subject along the lines of determining whether the electric industry is properly set up to develop the various lines of distribution as mentioned above. In certain territories today some of the above agencies are functioning to the exclusion of others. In connection with this situation it is suggested that it would probably be a very good thing for the electric industry if the situation were so handled that all of the above agencies would be given an opportunity to function in all of the territory involved. This means proper consideration of the price situation and proper education of the channels involved.

The interest taken in this problem by the various agencies mentioned above should be stimulated by pointing out what the proper development of this field means to them in their business. The central stations realize in a general way that the income from electric water heating is, usually speaking, extremely profitable. In this connection specific attention is called to a report of a survey made in the Pacific Northwest which survey was carried on by the Journal of Electricity and which appears in the October first issue of that paper, (1923). The following quotation is taken from that report:—

"In the case of revenue per kw. yr. it has been demonstrated by many western central stations that \$9.50 is a fair average annual return to expect from each kilowatt of range load installed. This load occurring at off-peak periods, in the main, serves to fill in load valleys and to stabilize system load factors. In the case of water heaters the average annual return per kilowatt has been double that of a range. These two facts prove that here is a type of load which cannot be overlooked."

In order for the other agencies to be interested there must be a reasonable profit in it for them. Theoretically speaking, this profit should be in accordance with the amount of work or sales effort put forth by the agencies in question on electric water heaters. This subject is one which the industry will have to work out and which to some extent local conditions will influence.

Under the general heading of "Merchandising" it is recommended that an effort be made to bring electric water heaters more forcibly to the mind of the public by proper display. This can be done by means of display cards or preferably attractive water heaters displayed on the sales floor. This should be done particularly in those territories where conditions point to the possibility of building up a good business in the sale of electric water heaters. This idea, although not a new one to the industry in the sale of electric water heaters, is merely named as one which could be very much further developed than is the case at the present time.

Technical Data.

It was thought by the committee that in addition to reporting on the sales situation this committee should also carry on a study along the lines of preparing some useful information to the industry on the proper application of electric water heaters to various installations. This subject is a large one to cover in this report. It was thought, however, that it would be helpful to define briefly the various types of electric water heaters. With these definitions in mind it could be the work of a future committee to prepare a tabulation indicating the various types of heaters as particularly applicable to certain specified conditions.

Concerning the matter of heater control, there are two general classifications recognized by the trade today, namely, the automatic type and the non-automatic type. The automatic heater may be full automatic in that the temperature of the water is controlled by a heat controlled device, or thermostat, which automatically maintains the water at a certain temperature; or it may be of the protected type, in that a heat controlled device is furnished which automatically disconnects the heater from the line under abnormal conditions. The operation of the non-automatic heater is controlled entirely by hand.

*Sub-Committee on Electric Water Heaters: J. M. Morris, chairman; W. Wesley Hicks, G. L. Stannard, S. P. Russell, H. A. Mulvaney.

In connection with these divisions there are two further divisions known to the trade as circulating heaters and insert heaters. Circulation heaters are mounted as a unit external to the tank containing the liquid to be heated and heat the liquid by drawing the cold liquid from the bottom and delivering hot liquid to the top of the tank. Insert heaters are heaters designed to be applied directly in the tank or container. Another type which has come into use in some localities is known as the strap-on type which is designed to be strapped on the outside of the tank. In addition to these types there is a type known to the trade as the faucet type; a device applied directly to the faucet from which hot water is to be drawn.

It was not possible for the committee to go into a detailed study of the various applications and uses of the different types mentioned above so it will not be attempted to cover this phase of the situation in this report. As stated above this could be profitably carried on by a subsequent committee.

Electric Water Heaters in Residences.

Continuous hot water service once enjoyed at reasonable cost becomes one of the most indispensable conveniences of the modern home. A dependable automatic electric water heater renders a service superior to that supplied by the fuel heater both as to constancy of temperature and greater amount of hot water available instantly. It seems to be agreed in the industry that the water heater has helped to increase the revenue from electric cooking consumers with little if any additional transformer capacity. It is a well established fact that an automatic water heater of a relatively small capacity connected to well insulated boiler will supply perfect hot water service and show better load characteristics than any other class of domestic load. However, with the exception of a very few central stations the electric water heater operates on the cooking rate with the result that the average consumer who would prefer to keep the water hot using 400 to 1,000 kw.-hr. a month installs a relatively large water heater and heats water intermittently using only 150 to 300 kw.-hr., thereby keeping his bill within his budget at a loss to the power company of the revenue on 250 to 600 kw.-hr. a month to say nothing of the less favorable load characteristics.

The data secured from a number of typical installations indicated that most of the consumers who have an electric range and an electric water heater keep the water hot continuously where the rate is 1.6c or 1½c for the purpose and consume an average of about 500 kw.-hr. per month using heaters smaller than 3 kw. Where the water heater operates on a rate of 2c or more most of the consumers heat water only as required, using relatively large heaters for the purpose and only the unusual consumer maintains continuous hot water service.

Consumers maintaining continuous hot water service state that electricity at 2c per kw.-hr. costs about 33 1-3 per cent to 50 per cent more than gas costs at 90c per thousand cu. ft. Apparently the 1½c block of the cooking rate, with due regard to heater capacities and boiler insulation, can be depended on to double the revenue being received from the average electric cooking consumer without adding transformer capacity.

Electric Water Heaters in Apartment Houses

The application of standard power schedules to water heating in apartment houses, particularly block rates based on the demand, has served to emphasize the relatively large revenue per kilowatt of connected load that can be earned if due care is used in designing the system so that the relationship between water storage and heater capacity is correct. In one apartment house of fifteen apartments a central tank with two 6 kw. automatic water heaters uses over 7,500 kw.-hr. per month and earns a revenue of more than \$100 per year for each kw. connected.

Following are the committee's recommendations:

(1) An electric water heater should be sold with every electric range.

(2) That water heaters with automatic control be recommended in every case. Where continuous hot water is to be maintained the thermostat functions to cut off the current when the contents of the tank have been heated to the desired temperature; where water is heated only as required or intermittently, the thermostat

serves as a safety factor, turning off the heater in case it is forgotten.

(3) That 2 or 3 inches of good insulating boiler cover should be used and all the hot water pipes should be covered including the pipe between the heater and the tank.

(4) That a "U" trap be used at the top of the tank in the hot water line to keep the water from creeping up into the vertical lines and wasting heat.

The Promotion of Electric Range Sales

By P. H. BOOTH*

THE reports on electric water heating and commercial application of electric cooking equipment to hotels and restaurants are covered this year in separate papers, but the committee did not feel it advisable or opportune at this time to undertake a lengthy discussion on the electric range business.

A great deal has been said and many profitable discussions have been had in the past in connection with electric ranges so that the committee felt the subject has been so thoroughly covered that it would hardly be possible to add a great deal of value as the results of the past year's additional experiences in the electric range work. The committee held three meetings during the year, one in Los Angeles on Oct. 9, one in Fresno on Oct. 21 and 22, and one at Del Monte on Jan. 25 and 26. At these meetings the subject was covered in a very careful and thorough way from all its angles and a definite program formulated for the conclusion of the work of the committee and the presentation of a report on the electric range business. However, as the investigations proceeded, in our efforts to collect the required data outlined by the committee as being necessary and useful in the formation of the annual report, it was evident that the work of the range committee was duplicating in a small way the work of the national committee being carried on in a much larger and comprehensive form. All of the member companies on the Pacific Coast were being asked to supply the same information to the national committee that we would have required for our report. Realizing that the report of the national committee would be ready for presentation in advance of the meeting of this association, it, therefore, seemed advisable that we should not duplicate the work of the national committee, and we recommend, therefore, that the individual members of this association study most carefully and deliberately the report of the Committee on Electric Ranges of the national association.

This report of the national association is divided into two parts, the first, a study of the value of the electric range load to the central station. The research work in connection with this subject is being done cooperatively by the national association and the central station and others interested, and the Northwest Geographic Section of the national association. The other phase of the work of the national committee is the popularizing and selling of electric ranges. This subject is divided into six sections as follows:

- (1) Engineering data manual
- (2) Sales management manual
- (3) Advertising manual
- (4) Retail demonstrations and sales manual
- (5) Water heating manual
- (6) Servicing manual

These manuals are being prepared by the Society for Electrical Development in cooperation with the national association. These six subjects will be handled in manual form and will cover approximately the following:

1. Engineering data manual; giving transformer sizes, meter sizes, copper, and all information relative to the distribution and physical connection of the range to the supply circuits.
2. Sales management manual; to include methods of analyzing field, policies in regard to selling prices, installation charges, time payments, specialty sales efforts, campaigns, premiums, sales stimulation, examples of actual campaigns.

*Sub-Committee on Electric Ranges and Water Heaters: P. H. Booth, chairman; O. E. Sholders, J. A. McWilliams, George T. Bigelow, J. W. Wrenn, H. K. Griffin, H. A. Cram, W. P. Schwartz, B. Y. Gibson, Milton Henoch, J. T. Deppe.

3. Advertising manual; to give the basic, underlying principles of a well rounded out advertising campaign, what can be accomplished by various advertising media, liberally illustrated with a concrete example of successful advertising.

4. Retail sales and demonstrators' manual; a manual showing the most effective methods and sales talk to be used by retail sales force in making sales to ultimate consumer and showing the methods to be employed by demonstrators both to prospective customers as well as to purchasers after the range is installed in the home.

5. Service manual; a manual giving information, ideas and suggestions regarding the proper organization of range service department including suggested records and stock to adequately serve customers.

6. Water heating manual; a manual giving comprehensive data regarding operation and installation, and desirability of water heater business, methods of promoting business, calculating installation, and data regarding the advantages of high and low water heaters.

It has been decided by the National Committee to defer the publication of the engineering data manual until after the conclusion of the investigations and surveys now in progress by the Northwest Geographic Section when more complete data will be available.

Quite aside from the work that the national association is doing and which the committee felt would be duplicated by our efforts in this territory, the electric range business during the year 1923, made very definite progress in the territory covered by this association. There were approximately 7000 electric ranges sold in the California territory, which is practically double the amount sold in 1922, and this result was accomplished

by effective publicity through the consumer coupled with aggressive work on the part of the dealers and central stations in the sale and installation and the demonstration of these ranges. Practically all the installations for these ranges were made by the dealers as was a large number of the sales, indicating that as the range business develops and the ranges become more known and resultingly more popular with the general public an increasingly larger volume of range business will naturally be done by the dealers as they are the logical distributors of merchandise. It is very evident, however, that in the present status of the range business, the missionary work and the responsibility for overcoming the sales resistance on the part of the general public must rest largely with the central station.

Summarizing the above, therefore, it is the committee's belief that manuals and other knowledge available in pamphlets or book form will not sell electric ranges. It takes hard work and resourceful salesmanship to accomplish the desired result. Also the value of the electric range as a builder of satisfactory public relations should not be overlooked and the public can be sold the electric range idea in a more thorough way only when those in the industry themselves are alert to the value and the advantages of electric ranges by personal use in their own homes.

Commercial and Domestic Air Heating

By G. L. STANNARD*

THE principles of operation of the various types of electric heaters overlap to some extent but in order to avoid confusion these classes should be designated by distinctive names. These names, if standardized by the trade, would become familiar to the public and lead to a better understanding of electrical heating apparatus. In the interest of simplification we recommend that the following terms be used when describing types of electric air heaters:—

1. Reflector heaters
2. Radiant heaters
3. Convection heaters
4. Radiant-convection heaters
5. Indirect heaters
6. Central system heaters

Reflector heaters. This type of heater usually operates at a high temperature giving off radiant rays which are concentrated in one direction by means of a reflector. They are usually built in smaller sizes and are not suitable for general heating.

Radiant heaters are similar to the reflector type heaters but instead of the rays being concentrated in one direction they are allowed to spread, thus allowing a greater heating radius.

Convection heaters are those in which all the heat is absorbed by the air coming in contact with the heating elements, heating the room by means of the circulation of warm air rather than directing the heat on objects in the room. This type of heating will more uniformly heat every part of the room.

Radiant-convection heaters are a combination of the radiant and convection types. The air in the room is uniformly heated by means of the movement of hot air with the slight amount of radiant heat.

*Sub-Committee on Commercial and Domestic Heating: G. L. Stannard, chairman; E. A. Wilcox, J. C. Douglas, P. P. Pine, (Adolph Strauch, resigned), David Reed, J. T. Deppe, H. V. Mooney.

Indirect heaters are those in which the electrical energy is used to heat some substance which in turn transmits its heat to the surrounding air by means of radiation and convection. These heaters are generally of the electric steam-radiator type.

Central system heaters are those in which electricity is used in the central plant for heating air which is transmitted into the room through ducts or by some substance which is carried through the room in pipes which in turn heats the air in the room.

Size of Heaters

Great care should be taken in order to calculate the proper size of heater required for a certain room. This cannot be accomplished by guess as to a certain capacity for a certain volume as this can vary from $\frac{1}{2}$ watt per cu. ft. to $3\frac{1}{2}$ watts per cu. ft. according to the size of room and radiation losses. A heater which is too small for properly heating the room only makes a dissatisfied customer to the detriment of electric heating in general. The points to be considered in the heating of any room are as follows:—

1. Area of glass
2. Area, construction and exposure of outside walls
3. Area and construction of inside walls and nature of the adjoining room
4. Area and construction of floor, also a thorough understanding of the conditions under the floor
5. Area and construction of ceiling and whether with floor above or open attic.
6. Volume of air in room
7. Number of air changes per hour

The various manufacturers of electric heaters usually supply data for the calculation of heater sizes which should be carefully followed.

WATTS LOST BY RADIATION PER SQUARE FOOT SURFACE FOR DIFFERENCE IN DEGREES FAHRENHEIT BETWEEN OUTSIDE AND ROOM TEMPERATURE.

Nature of Surface	10°F	20°F	30°F	40°F	50°F	60°F
Single glass	3.0	6.0	9.0	12.0	15.0	18.0
Double glass	1.7	3.4	5.1	6.8	8.5	10.2
Single skylight	3.5	7.0	10.5	14.0	17.5	21.0
Double skylight	1.8	3.6	5.4	7.2	9.0	10.8
4 in. brick wall	1.9	3.8	5.7	7.6	9.5	11.4
8 in. brick wall	1.3	2.6	3.9	5.2	6.5	7.8
12 in. brick wall	.9	1.8	2.7	3.6	4.5	5.4
24 in. brick wall	.6	1.2	1.8	2.4	3.0	3.6
4 in. concrete wall	2.3	4.6	6.9	9.2	11.5	13.8
8 in. concrete wall	1.6	3.2	4.8	6.4	8.0	9.6
12 in. concrete wall	1.1	2.2	3.3	4.4	5.5	6.6
24 in. concrete wall	.7	1.4	2.1	2.8	3.5	4.2
Outside wall plastered and sided	1.3	2.6	3.9	5.2	6.5	7.8
Partitions lath and plaster both sides	1.0	2.0	3.0	4.0	5.0	6.0
1 in. wood partition	1.2	2.6	3.6	4.8	6.0	7.2
Wood floor (double board)	.25	.5	.75	1.0	1.25	1.5
Cement flooring	.9	1.8	2.7	3.6	4.5	5.4
Wood ceiling	.3	.6	.9	1.2	1.5	1.8
Plastered ceiling (floor above)	.75	1.5	2.25	3.0	3.75	4.5
Plastered ceiling (no floor above)	1.0	2.0	3.0	4.0	5.0	6.0
Air per 100 cu. ft.	5.4	10.8	16.2	21.6	27.0	32.4

Heat Lost by Radiation

The accompanying table taken from the best authorities gives the watts lost per square foot of surface for differences in temperature in degrees Fahrenheit between outside and room temperature.

In order to calculate the volume of air, multiply the volume of the room by the number of air changes required per hour.

Due to the impossibility of accurately determining the exact heating requirements of any building on account of the variation in construction, great care should be taken to study all conditions and to allow adequate safety factors. The following co-efficients must always be taken into consideration.

For sides exposed to winds add 10 per cent to 25 per cent radiation losses.

For buildings heated intermittently with long intervals of non-heating add 10 per cent to 25 per cent.

FOR EXAMPLE:—Suppose a room 15 ft. x 25 ft. with 9 ft. ceiling, two outside walls, plastered and sided, single glass area 80 sq. ft. wood floor, plastered ceiling, no floor above, one change of air required per hour, required to raise the temperature from 40 deg. F. outside to 70 deg. F. inside and having a temperature difference of 20 deg. F. between adjoining rooms. Refer to table column 30 deg. F. temperature difference.

Area	Watts lost per sq. ft.	Total watts lost
Glass	80 sq. ft. x 9	720
Outside walls	(15x25) 9 80 x 3.9	1,092
Inside walls	(15x25) 9 x 2.0	720
Floor	(15x25) x .75	281
Ceiling	(15x25) x .3	1,125
Air	(15x25x9) x 16.2	545

Total watts lost..... 4,483

Position of Heater

This matter should be given careful consideration. The proper position of heaters which circulate the air in the room is usually found to be directly in front of the windows so as to move the air from the window and not towards the cold glass which radiates the heat rapidly. The proper position, however, has to be sacrificed very often due to the architectural design of the room, the draping of the window and the placing of furniture. Filling the room with smoke and watching the air currents in the room will sometimes aid materially in determining the best location of the heater.

Automatic Heat Regulation

This can only be accomplished by some means which will automatically turn off and on a portion of the heater or the whole heater according to the temperature of the room. There are automatic heat regulators on the market at the present time which can be connected to any type of heater to automatically control the temperature of the room. Testing room temperature can be accomplished only by the use of accurate thermometers properly placed in the room. These thermometers should be suspended where they are not in contact with the walls or furniture but should be so placed that they are subjected to free circulation of air.

Report of Sub-Committee on Methods of Selling Electric Heating

In order to take up this matter fully it is necessary first to outline the channels through which this merchandise is sold as follows:—

- 1. Department store
- 2. Hardware store
- 3. Electrical dealer
- 4. Central stations
- 5. Electric heating specialists
- 6. Electric heating manufacturers

1. Department Store: Unless the department store has a separate department for electric heating, with salesmen who are competent to figure the proper size of heaters required for various rooms, it is unwise to encourage them in the sale of heaters larger than those which can be operated safely on the convenience outlet circuit, as they are not familiar with the wiring requirements, the proper capacities or the rates, with the result that the customer receives something that is unsatisfactory and continues to tell friends and acquaintances that electric heating is unsatisfactory. The improper selling of one heater very often puts a damper on the future sale of several heaters.

2. Hardware Store: This class of merchandisers generally follows along the same lines as the department store.

3. Electrical Contractor-Dealer: The electrical dealer has the greatest opportunity for the sale of electric heating because he not only receives his profit on the article but also has an opportunity for a good wiring job. It is true that only a small proportion of electrical dealers understand how to figure a heating installation but the manufacturers all employ competent engineers who are always willing to cooperate with the electrical dealer and give him advice on any installation that he might have a prospect for. A word with the dealers who are taking advantage of this service will convince them of the profit derived from this cooperation.

4. Central Stations: The majority of the central stations have recognized the advantage and possibility of electric heating and their commercial departments encourage the use and sale of these devices. The central stations recognize the possibilities of the increased load from this type of apparatus and they are only too willing to cooperate with all branches of the industry to further the sale of electric heating. The department store, hardware store and electrical dealer should be encouraged to use the service offered them by the central stations and manufacturers.

5. Electric Heating Specialists: These specialists devote their entire time to electric heating, engineering and sales. They have collected a large amount of data taken from actual installations and are prepared to furnish estimated costs of installations and operations based on conditions in various localities.

6. Electric Heating Manufacturers are interested in the sale of heaters through the above channels providing they can be sold properly to the satisfaction of the customer and offer all assistance possible for the furthering of sales.

Market for Electric Heating

- 1. Domestic heating
- 2. Commercial domestic heating
- 3. Commercial heating

Domestic heating includes room heating for homes and flats.

Commercial domestic heating includes room heating for apartment houses, hotels and clubs.

Commercial heating includes office buildings, business buildings, schools, churches, banks, manufacturing plants, etc.

General Information

- 1. Cost of operation
- 2. Cost of installation
- 3. Installation
- 4. Maintenance of electric heaters
- 5. Safety of electric heaters

1. In the majority of cases that have been investigated the opinion the public now has that electricity is expensive for heating, has been the outcome of improper installations, due to the fact that they were sold heaters of insufficient capacity to do the work properly and that the heaters were being used on the lighting rate instead of the heating rate. The success of selling electric heating is not merely in selling a heater, but to properly instruct the party that is purchasing the heater exactly what its capacity for heating is and the rate that is available. Considerable difficulty in this respect would be overcome if the manufacturer would place a tag on each heater as follows: "See your power company for special rates on heating." The average monthly bill for electric heating usually is larger than that for other fuels on account of it being so convenient that it is used much more than other heating systems would be used. To the monthly bill for other fuels must also be added, before a comparison can be made, the extra cost for cleaning, tinting, painting, papering, etc. that would be necessary.

2. The cost of electric heating installations is not excessive compared with the installation of other heating systems, providing exactly the same results are given as would be obtained with other heating systems. In many cases the cost is much less. In a new building it will be found that by taking into consideration the elimination of all flues, chimneys, boiler rooms and other safety factors that have to be installed with other heating systems, the cost of the installation of electricity is no greater.

3. Effort should be made to prevent improper installations which have been the cause of unsatisfactory heating.

4. The maintenance of electric heating devices is much lower than that of those using other fuels.

5. The use of electric heaters approved by the National Board of Fire Underwriters reduces fire hazards.

Channels Through Which Electric Heating Should Be Encouraged

1. Owners of the homes
2. Owners of apartment houses, hotels, office buildings, theaters, etc.
3. Clubs, halls, churches, schools, etc.
4. Architects
5. Building contractors

1. There is a large opening for electric heating in the home. There are enough installations at the present time so that concrete data can be obtained as to operating costs, etc. Proper heating in the home is the opening wedge to heating in other buildings.

2. Numerous apartment houses, hotels, office buildings, theaters, etc. are being heated electrically at present with entire satisfaction to the owners and tenants. One of the main features in electric heating for this type of building is the flexibility under which it can be operated. In many cases the owner purchases electricity on a master meter thus earning a low rate and submeters it to the tenants.

3. Where electric heating is used in clubs, halls, churches, schools, etc. it is opening up a great field to the home user. When comfort is brought to the public in this way it convinces as to the results that can be obtained with a proper electric heating system.

4. Architects as a rule are averse to recommending any system of heating to their clients until such time as it has been thoroughly tried out. Many installations have been made by architects in their own homes for heating, with the result that they are specifying this method of heating to their clients. It should be the special effort of all branches of the electrical industry to furnish data to architects so they will be in a position to recommend electric heating to their clients. In general the client relies entirely on the architect. Even if other heating systems are installed, it is often possible to convince the architect of the advisability of placing heating plugs in the main rooms for use during the time that the central system is not in operation.

5. The building contractor should be advised to put in a main service of sufficient capacity to take care of any future heating requirements. This can be put in at a small cost during construction and prevents the necessity of defacing the building later with a large service pipe. The building contractor should be encouraged to:

1. Install large service conduit
2. Install service wires and main switch of sufficient capacity
3. Install heating plugs in main rooms
4. Install complete heating system

As the advantage of electric air heating is becoming better known, augmented by the satisfactory results obtained by present users, it is leading to the favorable acceptance of this method of heating.

It is the recommendation of this committee that thought be given to the establishment of a school of heating under the jurisdiction and control of the Pacific Coast Electrical Association; classes to be held by persons capable of imparting correct information on electric heating. These schools should be held in the larger cities in the territory of the Pacific Coast Electrical Association and should be open to the sales force of all merchandising channels.

Sub-Committee to Collect Data on Electrical Heating Installations

Data on the cost of installation and operation of electrical heating equipment must be very carefully compiled and more carefully used in order that it may not be misleading. Each case of heating has special features, which must be considered.

The present status of connected load of electrical heating was not investigated as most of the domestic installations are metered together with cooking and water heating load, and any comprehensive segregation of connected heating load is difficult to obtain. From manufacturers' statements, the increase of electrical

heating during 1923 over the 1922 figures was probably 300 per cent, or about the same increase as 1922 showed over 1921. Instead of attempting to check this growth it was deemed more valuable to study the fundamentals of the heating problems, and put them in shape so they might be used by salesmen or others in the electrical industry. With such a subject, and with so many variables, the biggest difficulty is to present a tangible idea to the general public. Therefore, this problem was attacked from a study of the results desired. It was thought that the attached comparative curves would put the story across to the electrical trade and they in turn must pass the story on. The subject was studied from the angle of special installations, attempting to find a basis of comparison between them or classifying the controlling factors so that the data gathered will emphasize the important points and can be used with as little variation as possible. The curves of use show the kw.-hr. consumption only, as the varying rates introduce further complications. The average cost, for heating only, usually lies between $1\frac{1}{2}$ ¢ and $2\frac{1}{2}$ ¢ per kw.-hr.

If properly applied, the possibility of electric heating represents a large field of use for the public utility and a big potential market for the manufacturer of heating equipment. The dangers of misapplied heating are large enough that every available improvement should be made and advantage taken of all possible conservation features.

Variables

Many variables enter into consideration of heating problems.

1. Weather conditions.

A prominent manufacturer of ventilation equipment states:

"In the United States 70 deg. F. is generally considered the most suitable temperature for a heated building. It should be noted, however, that temperature is not the only factor that causes a feeling of comfort or discomfort, since the relative humidity is also a determining factor. It has been recognized for years that air of very low relative humidity gives a feeling of coolness as compared with air of high relative humidity at the same temperature. With the air moving at a noticeable velocity the difference is more pronounced.

"The Chicago Commission of Ventilation thoroughly investigated this subject and worked out the relation of temperature and humidity over a range of degrees that covers what they have named the "Comfort Zone." This zone and others that are designated as "Too Warm" or "Too Cold" are shown on the chart below. From their investigations the comfort line, when plotted against temperature and humidity, is represented by the equation $R = 315 - 4T$, where R is the relative humidity and T any temperature above 55 deg. F. shown on the chart.

"From the chart it will be seen that at 70 deg. a relative humidity of 36 per cent tends toward the most comfortable feeling. It has been found by investigators that at 70 deg. from 35 per cent to 40 per cent is the most desirable humidity, yet in most heating specifications issued, and in the majority of recommendations made, a relative humidity of 50 per cent is called for. This is too high and causes a feeling of oppressiveness which would not exist if the relative humidity were reduced to 40 per cent. Aside from the comfort, it will be found difficult in most buildings to keep the windows clear of frost and condensation with high humidity during the coldest weather.

"A further consideration is the cost of adding to the air the moisture necessary to give a resultant high humidity. To add three grains of vapor per cu. ft. of air, as generally necessary to maintain this condition, requires the transference of 465 B.t.u. per thousand cu. ft.

"As seen in the chart, there is a considerable range of temperature with its corresponding proper humidity."

NOTE: 465 B.t.u. is equal to 465/3412 kw.hr. When it is considered that air at 30 deg. temperature and having a relative humidity of 75 per cent will have a relative humidity of only 18 per cent when heated to 70 deg. it is readily seen from the comfort chart (Fig. 1) that with this humidity a temperature considerably above 70 deg. will be required to make the room feel as warm as it should be. This excess temperature increases the radiation and air change losses and therefore means more costly heating. It will, therefore, be seen that an intermediate point can be located at which the best economy is obtained.

2. Hours of heating per day, or night.

Night heating is apt to be considerably more expensive than day time heating due to the daily variation in temperature.

3. The use of the building, number of occupants and their activity.

Each grown person under normal activity is equivalent to approximately 200 watts. Their rate of activity either increases or decreases this amount. Where large

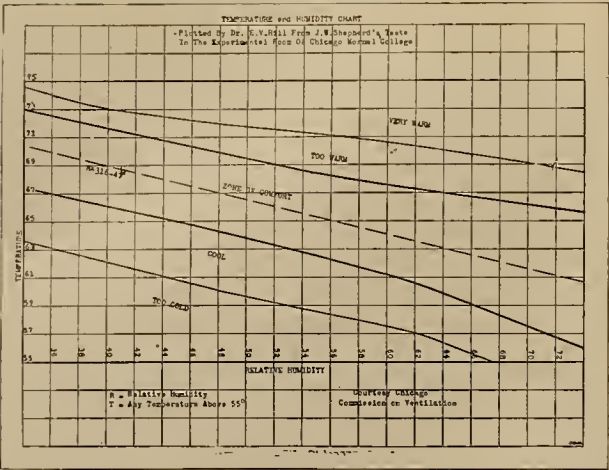


Fig. 1.—Comfort chart showing temperature and relative humidity.

numbers of people are congregated in a comparatively small space it is readily seen that they constitute a considerable item of heat introduced into the room. In addition to the heat furnished the room in this way, the greater the activity of the people the less they notice a sub-normal temperature.

4. Type of construction, materials used and exposure.

All of these items greatly improve the economy or waste of heating and with the present type of construction there is material room for advancement along this line.

In order to get a comparative basis for costs in California, curves have been plotted (Fig. 2 and Fig. 3) to show daily and yearly average conditions for three localities:—Los Angeles, San Francisco, and Fresno. Also, wherever data were available, curves have been plotted to show the consumption by months for various conditions of use and construction such as:

- Residences Fig. 4
- Apartments Fig. 5
- Schools Fig. 6
- Churches Fig. 7
- Dance halls and theaters..... Fig. 8
- Hotels and hospitals Figs. 9, 10
- Businesses Fig. 11

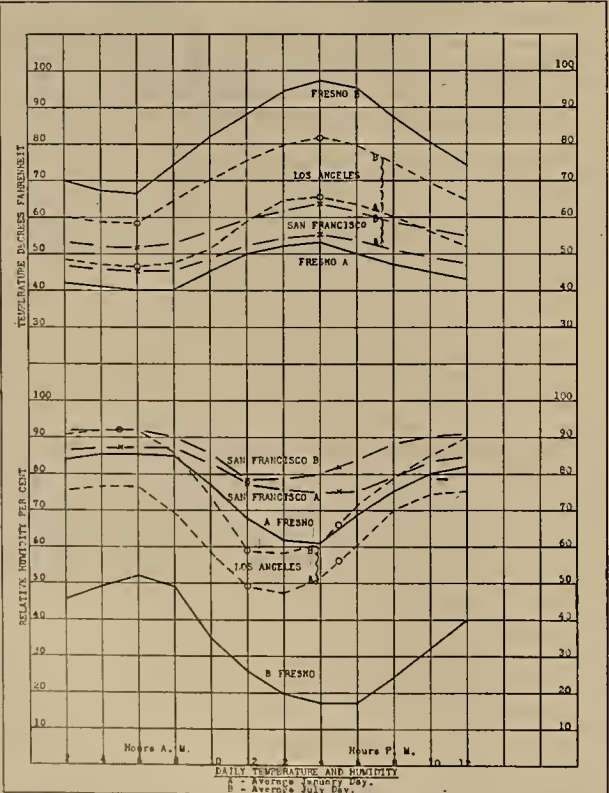


Fig. 2.—Curve showing average daily temperature and humidity for three cities on average January and July days.

By segregating the consumption under these various classifications into the (1) losses due to radiation, (2) to the changes of air, etc., these varying, of course, with the (3) size and type of building, the (4) number of people present and their activity, it is hoped that the largest losses in electric heating will be located, and concerted effort can be made to reduce these losses and thereby increase the potential field of use.

To illustrate the fundamental differences in heating conditions, compare the typical bungalow room of 15 ft. x 25 ft. x 10 ft. with a theatre building for 590 seats, having dimensions of 36 ft. x 112 ft. x 24 ft.

Case I—Bungalow room (40° outside temp.)

	Area sq. ft.	Watts loss per sq. ft. at 30° temp. diff.	Watts Required
Windows	100	9	900
Ceiling	375	3	1125
Floor	375	0.8	300
2 inside walls.....	400	3	1200
2 outside walls.....	300	4	1200

Total radiation losses.....4725

One air change per hour* requires..... 607
Heat generated by two people..... 400

Ratio $\frac{\text{Radiation losses}}{\text{Total losses}} = \frac{4725}{5332} = 89 \text{ per cent.}$

(*Sufficient for two people:—1800 cu. ft. per hour per person is recommended for homes. In theatres, churches, etc., 1000 cu. ft. is the figure used).

Case II—Theatre building.

	Area sq. ft.	Watts loss per sq. ft. at 30° temp. diff.	Watts Required
Ceiling	4032	3	12096
Floor	4032	1	4032
4 Walls	7104	4 (8 in. brk)	28416

44544 kw.

100 cu. ft. of air each for 500 persons requires
.0054 x 30° x 500,000 =81,000 kw.
Heat generated by 500 people = 100 kw. equiv.

Ratio of $\frac{\text{Radiation losses}}{\text{Total losses}} = \frac{445}{1255} = 35 \text{ per cent.}$

From these approximate calculations it is seen that without considering the large heating equivalent of the persons in the theater, the radiation losses are a minor

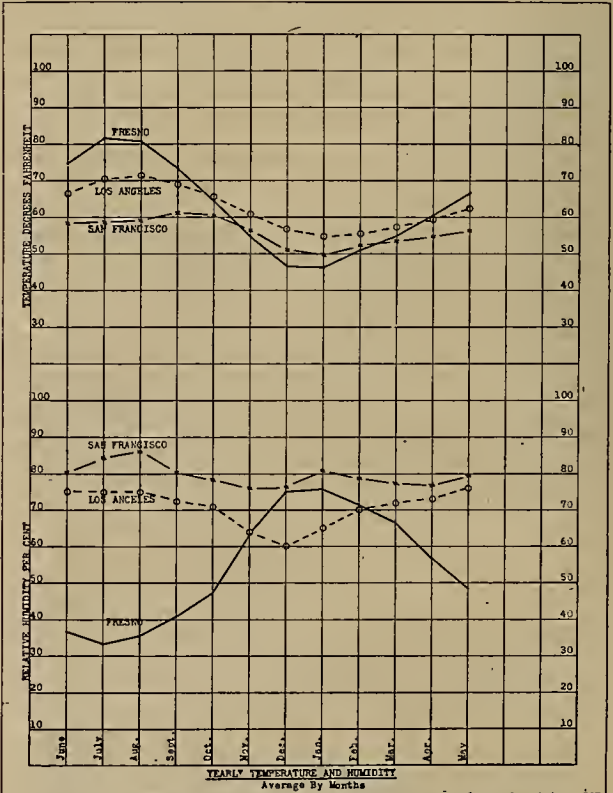


Fig. 3.—Curve showing yearly temperature and humidity for three cities.

factor in such an installation instead of decidedly a major factor as in bungalow heating. Therefore, the theater heating problem centers on the necessary heating of the building before the audience arrives. In the same way apartment heating is found more economical than individual residence heating.

Conclusions and Recommendations

It is the opinion of this committee:—

1. That there is a big potential possibility in the electric heating load.
2. That it is already a large industry and will continue to grow even without assistance from the electric utilities as a whole, but if properly studied and encouraged for its most profitable applications this potential field can be materially enlarged.
3. That the weather conditions in any particular locality must be thoroughly studied in order that proper installations will be made.
4. That every possible conservation should be made in building construction in order to improve heating conditions and thereby improve the economic possibilities of electric heating.
5. The aims and purpose of this paper will have been accomplished if the one thought is left in the reader's mind that the heating problem is one which cannot be dismissed as a simple subject, but that if a thorough study is made, many possibilities for advancement are open. Careful consideration should be given to all the factors influencing each of the consumption curves included in this paper.

APPENDIX

Residence Consumption

Berkeley Residence—H. J. Gute, Northbrae.

Electric Range 8 kw.

Water Heater 6 kw.

Air Heaters23 kw.

Total37 kw.

Probable consumption is 375 kw.hr. per month.

Fresno Residence—A—7 Room Aeroplane Bungalow, 1562 Roosevelt.

Electric Range 5 kw.

Water Heater 3 kw.

Air Heaters 4 kw.

Total12 kw.

Probable consumption is 325 kw.-hr. per month.

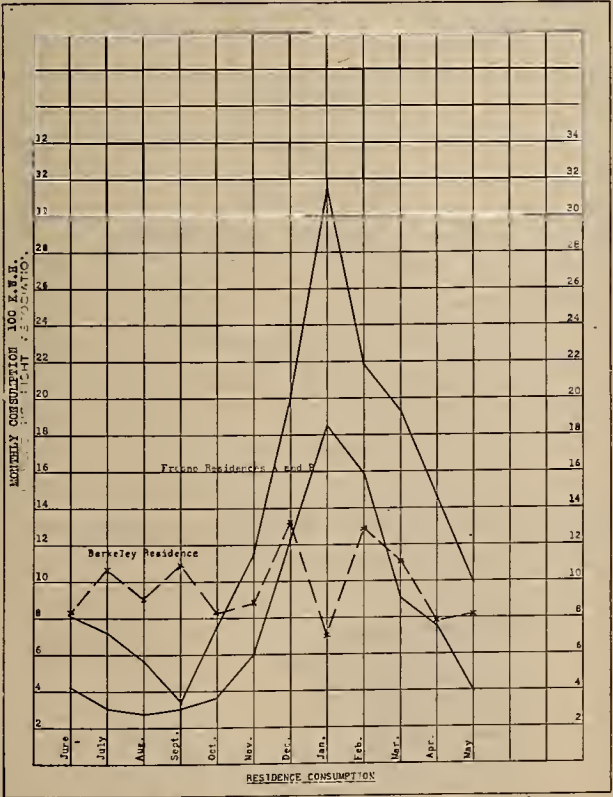


Fig. 4.—Curve showing residence consumption by months.

Fresno Residence—B—6 Room Bungalow, 3347 Mono.

Electric Range 7 kw.

Water Heater 5 kw.

Air Heaters 4½ kw.

Total16½ kw.

Probable consumption is 375 kw.-hr. per month.

Apartment Consumption

Oakland—Merritt-Grand Apartments, Frame Stucco Building. 16 Four Room Apartments.

13 Air Heaters, 2 kw.26 kw.

12 Air Heaters, 1 kw.12 kw.

Total38 kw.

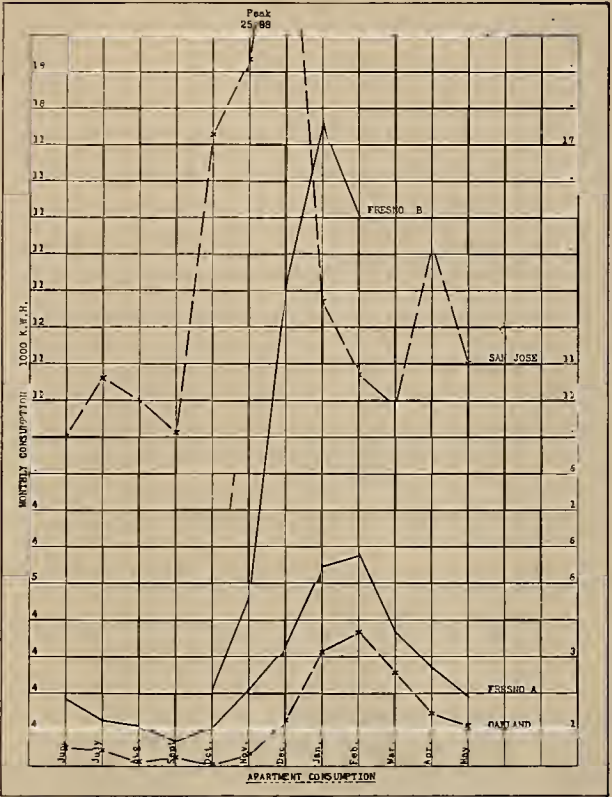


Fig. 5.—Curve showing apartment house consumption by months.

San Jose—Fredson Apartments.

15 Air Heaters, 3 kw.45 kw. (approx.)

Fresno—Jorgensen Apartments—A—8 Apartments, Frame Building, each having

Electric Range 5.54 kw.

Water Heater 3.00 kw.

Air Heater 3.00 kw.

Total92.32 kw.

Probable consumption is 1600 kw.-hr. per month.

Fresno—Nelson Apartments—B—8 Apartments, Frame Building, Each having

Electric Range 8.16 kw.

Water Heater 3.00 kw.

Air Heaters 5.00 kw.

Total129.28 kw.

Probable consumption is 2400 kw.-hr. per month.

School Consumption

Berkeley--Cora Williams Institute.

10 Rooms, 31 x 35 ft.

Hall, 40 x 40 x 22 ft.

Guest Room 10 x 12 ft.

Air Heaters, 55 kw.

Esparto—High School.

44 Air Heaters, 188.5 kw.

Average monthly consumption, 3360 kw.-hr.

Maximum demand of 128.7 hp.

Elsinore—Grammar School.

Air Heaters, 99.8 kw.

Burbank—Abraham Lincoln School.

Stucco Building, 145 x 52 ft. and wing 36 x 40 ft.

Five rooms.

Air Heaters, 13 of 5.28 kw. each.

Total, 68.64 kw.

Clarksburg— Grammar School. (New.)

98 kw.

Sacramento—Riverside School. (New.)

98 kw.



Fig. 6.—Curve showing school consumption by months.

Modesto Junior College (approx. 2 heaters per room)

52 Air Heaters, 290 kw.

Nov. 28 to Dec. 31, 18,000 kw.-hr.

Dec. 31 to Jan. 30, 23,000 kw.-hr.

Church Consumption

Oakland—3rd Church of Christ Scientist.

Frame Building, 3 rooms.

Air Heaters, 10 of 3.3 kw. each, 2 of 2.69 kw. each.

Total, 38.28 kw.

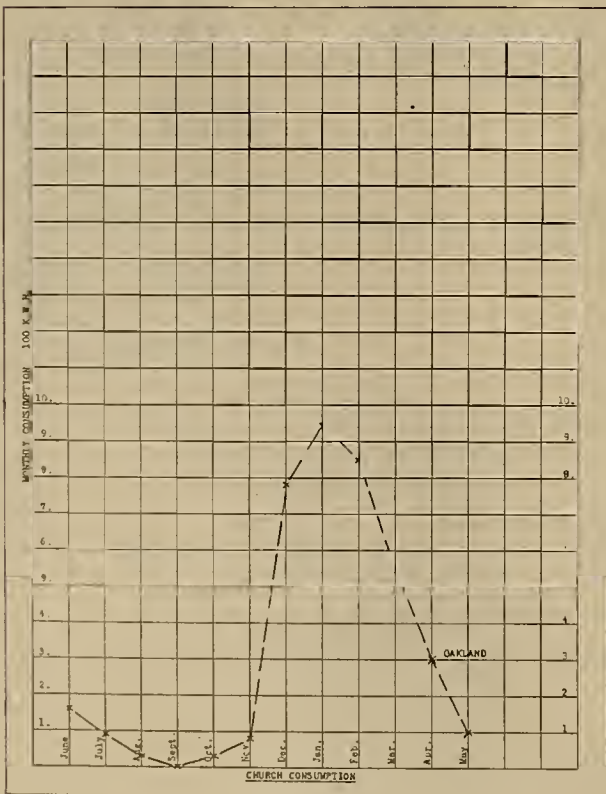


Fig. 7.—Curve showing church consumption by months.

Theatre Consumption

Modesto—Richards Theatre.

Motion Picture Theatre—Capacity 900 persons.

Air Heaters, 96 kw.

Note: Consumption available for one month only.

Fresno—White Theatre.

Capacity 1,400 persons.

Air Heaters, 125 kw.

Fresno—Severance Dancing Academy.

Stucco Building with Large Window Space.

Ball Room 82 x 45 x 15 ft.

Water Heater 2 kw.

Ball Room Air Heater 24 kw.

Other Air Heaters, 3— 2 kw.

1— 1½ kw.

Total 30½ kw.

Classes are held on an average of two per day, one in the afternoon and one in the evening. Evening parties are frequently held, which, of course, last longer than the dancing classes.

El Centro—Valley Theatre.

6 Air Heaters, 26 kw.

No operating data available.

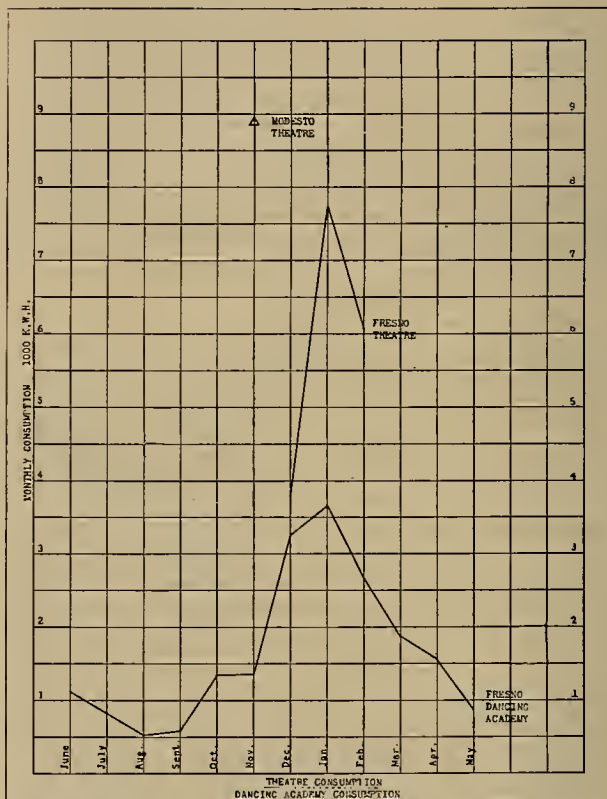


Fig. 8.—Curve showing theater and dancing academy consumption by months.

Hotel Consumption

Merced Hotel.

62 Rooms, 10 ft. x 12 ft. x 10 ft. and lobby.

Air Heaters, 62 of .96 kw. each, 4 of 1.44 kw. each.

Total, 65.28 kw.

Paso Robles—A—Hotel Taylor.

20 Rooms.

Air Heaters, 20 1 kw. each.

Also 5 kw. Water Heaters.

Total, 25 kw.

Paso Robles—B—Hi-Way Annex.

28 Rooms.

Air Heaters, 28 2 kw. each.

Total, 56 kw.

Hospital Consumption

Visalia—Tulare County Health Center Clinic, One story brick building.

9 Air Heaters, 6 kw. each.

Total, 54 kw.

Merced—Mercy Hospital.

12 Private rooms

3 Wards.

7 Nurses rooms (Quarters).

1 Nurses living room.

6 Miscellaneous rooms.

Electric Range 22.00 kw.

Electric Sterilizer 15.58 kw.

Electric Water Heater 10.00 kw.

Electric Range 3.00 kw.

Electric Air Heaters 64.90 kw.

Total 115.48 kw.

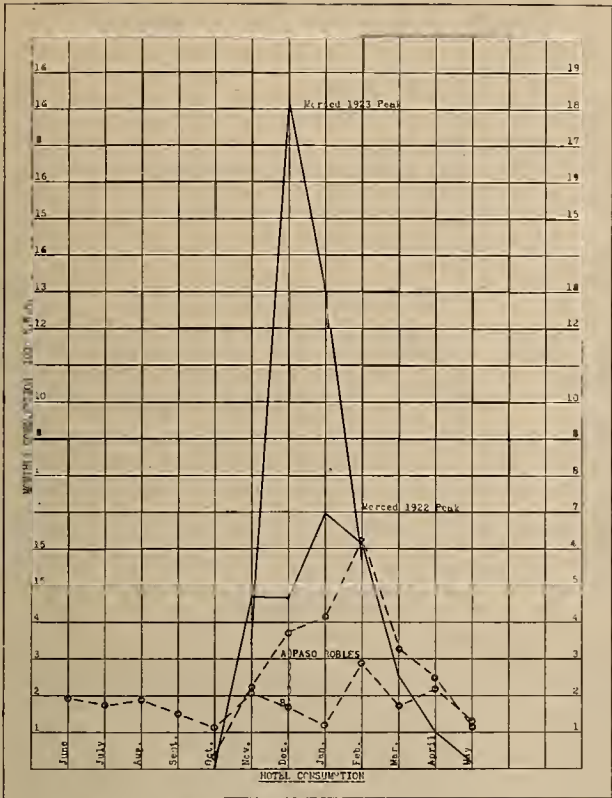


Fig. 9.—Curve showing hotel consumption by months.

Fresno—Union Hospital.
One Story Concrete Building.
16 Private Rooms
4 Miscellaneous Rooms.
Electric Range, 13 kw.
Water Heaters, 20 kw.
Air Heaters, 19.32 kw.

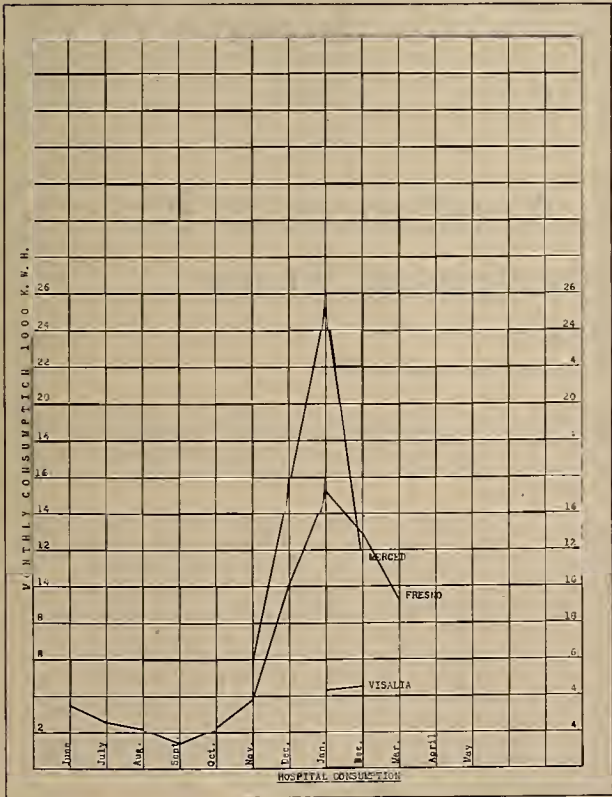


Fig. 10.—Curve showing hospital consumption by months.

Business Consumption
Sacramento—Sacramento Northern R. R. general offices.
Water Heaters, 3 kw.
Air Heaters, 62 kw.

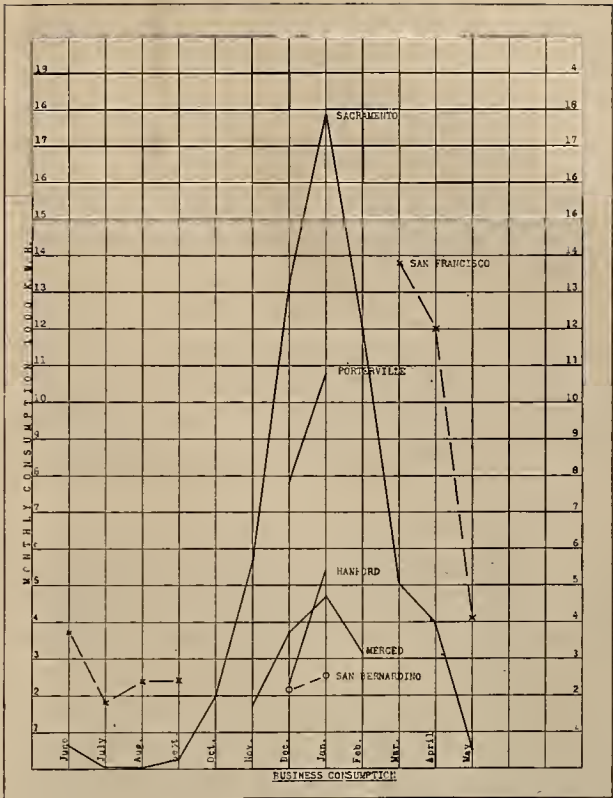


Fig. 11.—Curve showing business consumption by months.

San Francisco—Chester N. Weaver Co.
Concrete Building, 400,000 cu. ft. heated.
Air Heaters, 190 kw.
Merced—Real Estate Office.
23 ft. x 60 ft. x 16 ft.
Air Heaters, 19 kw.
Hanford—Office Building.
Two Story, 75 ft. x 200 ft. brick building.
Air Heaters, 33 kw.
Porterville—Home Bank.
Air Heaters 35 kw. (approx.)
San Bernardino—Southern Sierras Power Company Office.
Brick Building, 27 ft. x 49 ft. x 14 ft.
Air Heaters 15.86 kw.

Glossary

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The Proper Handling of Salvage,
Waste and Obsolete Material
By W. J. McCULLOUGH*

THE intelligent handling of scrap and obsolete materials and equipment is one of the important features entering into material control and in a great many of our public utilities the surface has hardly been scratched when considering the savings that may be effected. We can not too clearly bring to attention the principle that nothing is to be wasted and that it is the duty of the stores department to see that everything possible is made available for further immediate service, with as few handlings as possible.

A little study shows that scrap is accumulated largely as a result of obsolescence, some breakage; also the

*Salvage, Waste and Obsolete Materials Bureau: George C. Robb, chairman; W. J. McCullough, S. B. Patterson.

wearing out of certain parts cause the accumulation of some scrap metals. However, it is from the following sources that the greater quantity is accumulated:

- 1.—Change of standards.
- 2.—Duplicate shipments of special material.
- 3.—Overshipments.
- 4.—Wrong shipments owing to wrong descriptions, etc., being given on the orders.

This material is usually retained at the suggestion of some one that it will come in handy some time, with the result that nine times out of ten there is no demand and it is carried indefinitely.

Disposition

The suggested method of disposal is that such items should, immediately on receipt at the store, be reported by the section storekeeper to the storekeeper who in turn should report same to a material committee, consisting of representatives from the engineering, construction and operating departments, who meet at the call of the general storekeeper, who should be chairman of the committee and give final disposition on any items thus accumulated.

Reclamation Plant

A reclamation plant should be under the direction of the stores department and all materials and equipment on which there are serviceable parts should go through this plant in order that nothing serviceable may be disposed of.

A thoroughly accurate and complete record of all materials and equipment, giving proper catalog and blue print reference, should be arranged in alphabetical order for the guidance of the men handling the papers and the materials at the stores in order that when an item has been officially declared obsolete it will not again be taken into stock as serviceable but will be transferred direct to the scrap and obsolete warehouse.

Classification of Materials

For convenience in handling and accounting a classification of the scrap accumulated should be set up. Following is a suggested arrangement:

Aluminum—Cable and miscellaneous
Aluminum—Cast
Brass—Borings
Brass—Castings—light and heavy
Copper—Bare
Copper—Borings
Copper—Insulated
Copper—Heavy bar and casting
Iron—Gray—cast
Iron—Malleable—cast (insulator tops only)
Iron—Wrought (includes iron rail and pipe under 3 ft.)

Lamps—Butts
Lamps—Burned out and defective—75 Watt and up
Lamps—Burned out and defective—15 to 60 Watt
Lead—
Lead—Battery Plates
Pipe—Three feet and over
Rope—
Rubber—Gloves
Rubber—Inner tubes
Rubber—Outer casings
Rubber—Boots, solid tires and miscellaneous
Sediment—Battery—mud
Steel—Angle iron, channel and "I" beams
Tubes—Boiler
Wire—Iron and cable—bare
Wire—Insulated
Zinc—

Method of Handling

It is necessary that advantage should be taken of every means to reduce the cost of handling. Labor charges should be watched continuously, giving the same consideration to the installation of labor saving machines as any good business man would do. Arrangements can be made in district stores and shops to have the scrap classified largely when it is loaded making it unnecessary to do more than unload direct to bins at the headquarters. By using care and good business intelligence in handling scrap it should be possible to do the work with a minimum of expense and a maximum of profit to the company.

Method of Pricing

The classification may be priced and sent out to various stores and departments periodically, advising them of the prices to be allowed for each item for the ensuing three months, (for example) at which time the prices may be revised by taking the total amount of each item sold during the time elapsed since the date of the last revision, dividing the quantity into the money, and, if advisable, changing the price to be allowed for the coming period. The prices shown would be for use of stores or departments transferring materials and has no connection with the price at which the sale of these materials may be made to dealers.

Sale of Salvage

A final inspection of scrap metals and obsolete machinery and equipment should be made at the time this material is loaded for sale. In order to save transportation and handling costs, scrap poles, cross arms, packing boxes, etc., should be sold locally by the districts and departments accumulating such scrap. These sales should be made on regular sales order forms furnished by the proper authority and only after the officer in charge of materials and equipment has given authority to dispose of such items by sale to outsiders.

The Selling of Electric Appliances is No Problem to the Department Store

By E. A. NORTON*

Manager, Electrical Department, Barker Bros., Los Angeles, Calif.

THE reason that the merchandising of electric appliances presents no new problem to the department store is clearly evident to most of us when we once realize that the department store simply classifies the electric appliance as an item to be bought and sold like any other item. The electric appliance is given the same treatment as crockery or clothes or toys and the same results are expected. On being assured that the margin is sufficient to cover overhead and leave a small net profit, the merchandising of the device ceases to be a problem.

The amount of business done on these devices is as much or as little as policy dictates. This rests entirely with the desire of the department manager and of course is governed by his knowledge of and interest in the devices. Sometimes the electrical devices are in a department by themselves, or in a sub-department, but more often they are simply a few of many items in a large department. The amount of electrical appliances distributed by the department stores is tremendous when compared to that sold by the strictly electrical

dealers. Many department stores sell more electrical devices at retail than the large electrical jobbers do at wholesale. And this is not surprising when we look for the reason.

Let us then take a look at the picture. It is almost an exact copy of the picture that we have for years been trying to impress on the electrical dealer. The electrical dealer cannot "register" for the reason that he is not equipped to carry out the various processes of development and produce the negative that we all wish to see. We all know that when given desirable location, proper display, sufficient and complete stocks, multiplied by trained salesmanship and consistent advertising, backed up by efficient service and sufficient funds, aided and abetted by easy payment terms and attractive prices, we will get only one answer,—and that is, volume sales.

And the department store has all of these. The store is located convenient to the mass of the buying public. Careful consideration is given to the proper side of the street; proximity to street cars, and to other stores that cater to the masses; maximum amount of show window space available, and numerous other im-

*This paper is made a part of the report of the Appliance Sales Committee.

portant features. The whole thought on location is governed by the number of people of a buying mood that can be counted on to be coaxed through the doors.

The merchandise is displayed in an attractive manner in its proper surroundings. In dustless show cases or on clean shelves it presents an appeal for purchase. Experienced display men arrange and rearrange displays and sometimes whole departments in order to get the correct setting. Attractive cards get the attention of the passer-by. Dust litter and dirt are removed as soon as they are noticed by the employees. To be out of or not to carry in stock an article that is in popular demand is a reflection on the ability of the department buyer. Many stores maintain a perpetual inventory and stock clerks are on the alert to see that low stocks are immediately replenished. Department buyers have learned the lesson that to be continually out of various items causes the buying public to patronize stores that are equipped to supply their every need.

One might get the erroneous impression that the salesmen in the department stores are unfamiliar with the fine art of salesmanship. This is not the case because the heads of departments are constantly training and instructing those under them. Regular sales meetings are held. Advancement and increased compensation is available to those who show real ability. Many of the departments pay their sales people on a basis of drawing account against commissions so the incentive for volume of sales is always before them. The experienced sales person makes a very good salary because he has a vast number of customers to work on. Special commissions and bonuses stimulate to greater effort. While some of the department store sales people might lack a complete technical knowledge of the item they are selling, they do not lack a knowledge of the motives that cause people to buy, nor are they unfamiliar in the art of selling something in addition to that which the customer came in to purchase.

The effectiveness of department store advertising is evident to anyone who has seen the crowds of women rushing into a store in response to a newspaper mention of a sale or special demonstration. A woman reads the department store advertisements before she does the news or daily scandal. The advertisement departments are maintained at the highest point of efficiency. No expense is spared in this department. Talent of the highest calibre is employed. This includes copy writers, artists, photographers and so forth. It might well be said that the advertising department is the life blood of the store. Without its help the store would perish.

When one views the entire scope of the departments that have all service matters under their direction and control, he ceases to marvel at the wonderful service given by department stores. An order is placed with a sales person for an article and delivery is promised the next day, and on the next day it is delivered. If it should for any reason whatsoever not arrive on the day promised it becomes a serious organizational matter. If the article when received is not as represented or is defective the purchase price is cheerfully refunded or a

perfect article is immediately delivered. Should the article not give the wear or service that is expected, satisfactory adjustment is made. An efficient adjustment department is maintained to see that the customer is made happy in the settlement of every complaint. Every effort is made to keep the good will of the customer. Good will costs a lot of money to get and is carefully guarded after being once attained. Let a customer complain to the adjustment department that her washing machine complaint has not been taken care of and someone must shoulder the blame for negligence.

Having sufficient funds the buyers can buy in large quantities, obtaining the lowest prices. Savings in freight are effected by shipping consolidated carloads. Money is always available in order to take care of special job-lots, close-outs or bankrupt stocks. Doing such a huge volume of business the department store can afford to pay salaries that are attractive enough to enable them to employ the highest type of business men. With the means of bringing to them the best men of the country it is not surprising that they have made such wonderful success.

Most of the stores find it unnecessary to liquidate their installment paper. They, therefore, are in a position to offer very convenient credit terms with low rates of interest. Having, one might say, almost unlimited funds, full advantage is taken of the opportunity to increase sales by selling on the easy payment plan. Usually a very small down payment is used to lure the customer into the store.

The department store will maintain prices on items on which there is a standard price. However, they are constantly on the alert to purchase items that are competitive to the nationally advertised brands and on which there is no set price in order that they may be used as "leaders." These items are offered at sale prices. Many times goods are sold at cost in order to get the buying public into the store. On other lines these stores buy direct from the manufacturer and the wide margin permits selling at a discount and with still a fair net profit. The department store is ever ready to take up the sale of any article that can be sold at a profit. If certain electrical devices are not sold, it may be taken as assurance they cannot be sold at a profit. Any time the electrical industry wants to make the electric range as popular as the gas stove, all that is necessary is to let the department stores merchandise them as they do other electrical devices.

In conclusion, it should be said that department stores are successful because they know how to merchandise. The knowledge of how to buy and sell at a profit has been acquired after years of hard experience. Therefore, let us not be too hard on the electrical dealer if he fails to measure up to what is expected of him. As he becomes proficient in the use of all of the tools of the merchandising trade, he will prosper and be successful. Where the industry has erred is that those who have tried to help him use these tools have not, themselves, mastered their use. One might say it has almost been a case of the blind leading the blind.

The Promotion of Electric Appliance Sales

By H. C. GOLDRICK*

THE purpose of this committee has been to study the development of electrical appliances, recommend methods to popularize their use and present plans for productive selling. (Appliances included in this work of not more than 660 watt consumption.)

To have thoroughly and consistently followed the procedure as designated by the purpose of the committee would have required many meetings and discussions but the pioneering and following of these same problems had already been conducted by the national and sectional bodies and by many of their merchandising committees. The difficulties encountered in the early days are still present, but due to the thought and action which has been expended upon them during the

past few years, the mountains are not as high or the chasms as deep. A comparison need only be made between pre-war and present conditions to show how much progress has indeed been made. However, new angles on old problems have developed and it has been the endeavor of the Appliance Committee to cover these latter developments.

The inroad made by the department store upon a field originally developed and exploited almost exclusively by the central station and electrical dealer has been of deep concern to all engaged in the various branches. The committee feels fortunate to be able to present herewith a paper by E. A. Norton, for seventeen years in the electrical jobbing field, and now a department head of one of the largest and most successful department stores of the entire country. His statements of facts can be profitably absorbed by the industry. It is the thought of the committee that when these

*Sub-Committee on Appliance Sales: H. C. Goldrick, chairman; J. C. Hobrecht, J. A. McWilliams, H. L. Miller, R. E. Heerman, G. W. Barker, A. L. Spring, W. C. Wurfel, C. Clifford, Carl Heilborn, A. H. Nicoll, J. P. Bowden, Fred Lantz, George T. Bigelow.

cardinal points of successful merchandising are generally adopted and practiced by all engaged in electrical selling that the major part of our problems will be behind us.

During the Fresno and Del Monte meetings certain discussions were held and some resolutions were passed, covering fundamentals of importance. In the majority of cases these have been previously included in national and sectional activities but the committee considers them of such importance as to justify a repetition with certain recommendations to meet the present day situation.

Distribution

The first electrical appliances were marketed through electrical channels exclusively; gradually other outlets have developed, in spite of an effort at one time to confine the selling within original bounds. Fortunately, the industry has conformed itself to the natural development. In order to clear any remaining doubts, the committee at the Fresno meeting went on record as recognizing the necessity of encouraging all legitimate and ethical outlets of electrical merchandising. It is the belief that there are several channels of distribution, that these will not conflict but, on the other hand, will tend to develop each other, and that local conditions will largely determine which will predominate in their respective localities. Restriction should be supplanted by cooperation. The committee has also recorded its appreciation of the pioneer work performed by the electrical contractor-dealer and has expressed its confidence in him, with a pledge to support him in his future development as an electrical merchandiser.

Whether or not a dealer may prosper on electrical sales only has been found to depend upon the dealer and local environment. There is record of many successful exclusive electrical dealers, while on the other hand, some have never prospered until they included other classes of merchandise. The successful exclusive dealer, as a rule, depends upon canvassing. The successful dealer with other lines depends largely upon stores sales. The latter appears to have been gradually brought into this arrangement due to difficulty in securing the proper type of canvasser. For those dealers who have determined upon the advisability of including other than electrical items, the committee calls their attention to the very complete report and recommendation of the Merchandise Sales Division of Electrical Merchandise presented to the N. E. L. A. at Pasadena, May 18-22, 1920. It is suggested, furthermore, that the dealer of limited capacity carefully consider the additional capital required when any expansion is planned.

Advertising

From a survey of advertising leaflets, folders and books on the stock shelf of any dealer it is quite evident that more is being produced and supplied than good judgment can justify. Hundreds of thousands of dollars are being wasted annually through neglect and obsolescence. One dealer who purchased goods to the amount of \$3,000 in one year requested folders for the first part of the next year to the amount of \$400. This was also in addition to an advertising allowance in the previous year of \$150. The committee recognizes the value of proper advertising matter in sufficient amount to bring the article to the attention of the prospective purchaser, but it is inevitable that an unjust burden on the manufacturer must sooner or later be passed to the retail purchaser. It is recommended that careful consideration be given by the manufacturer to the advisability of making a nominal charge for all advertising matter so as to insure its economical distribution.

The value of newspaper advertising is above debate. However, some dealers are too economical while others swing to the opposite extreme and spend beyond reason. It is recommended that an annual budget be established, based upon 5 per cent of estimated sales, this to be used for consistent advertising throughout the year, and supplemented by whatever additional amounts are supplied by the manufacturer or distributor. As these two latter organizations are experienced in advertising and maintain departments for this purpose, it will be economy for the dealer to have his advertising laid out by their experts. Special campaigns or "splash" advertising should not be indulged in except after due deliberation and consultation with the manufacturer or

distributor and then only when the expense can be positively justified.

Salesmen

The lack of retail salesmen is felt today by every dealer in electrical merchandise, but more especially by the dealer who depends to any extent upon canvassing. After lengthy consideration of this situation at the Del Monte meeting the following resolution was unanimously adopted:

WHEREAS it has developed in discussion that education on electric sales and application is still very much needed among the ranks of the industry, especially among those who meet the public in any capacity whatsoever, namely: salesmen, wiremen, metermen, troublemen, servicemen, deliverymen, minor executives, etc. and

WHEREAS there is a manifest lack of consideration on the part of these people as to the service which these devices will render, together with a lack of knowledge of the device itself and its application, be it therefore

RESOLVED that a means should be provided by one of the national co-operative organizations—either the N. E. L. A. or the S. E. D.—which means should present to all members of the industry the comfort and usefulness which electrical appliances render in daily life and the savings effected by these devices, and be it further

RESOLVED that this means be made available through all the various electrical organizations to all members of the electrical industry, these organizations being the A. F. of L., I. B. E. W., and all other organized bodies interested in the electrical development of the United States.

The spirit of this resolution is in accordance with the work which has already been done by the national body in formulating and offering at cost a course of instruction to electrical salesmen. An announcement of a new course for \$12 was made in the February number of the N. E. L. A. Bulletin. The committee at the Del Monte meeting recommended that a delegate be sent to the national meeting to lay special emphasis upon more intensive sales training of the present employees in electrical selling organizations and offering inducements to attract more and desirable talent into electrical selling. All manufacturing and distributing organizations now have sales promotion departments equipped to train the dealers' organizations toward better selling and the committee earnestly urges that every selling organization call upon its suppliers for this help, which is to be had for the asking.

Profits

The margin of profit to the dealer from sales has been gradually increasing until there is now a fair balance left for net. The increase has in most cases resulted from higher re-sale prices, thus passing it to the retail purchaser. It is apparent that the limit in this direction has been reached and in order to allow additional margins to the dealer which will put him on the same level with merchants of other lines, it will be necessary to effect savings in production and distribution costs. The former is in the hands of the manufacturer entirely and without question is receiving proper attention. The latter is in the hands of the dealer as well as the manufacturer or distributor. The dealer can assist in lowering costs of distribution by properly anticipating his requirements:—thus saving rush shipments,—ordering in standard package lots, and in minimum weight quantities. Unjust requests upon the supplier for replacements, free service on appliances when due to the customer's fault, and unwarranted sales assistance or duplication of effort, all lead to increased costs. The application of the golden rule will eventually react in lower costs and lower prices to the public. As costs are lowered it will be possible to increase remuneration to the sales organization and thus attract the type of personnel which we wish to make a part of the electrical industry, in one branch or another.

Conclusion

A review of conditions in the field and a digest of the various topics discussed at the Fresno and Del Monte meetings, as well as in sub-committee meetings, demonstrate that the entire industry is alive to the problems facing it, that genuine effort is being made to solve these problems and that actual progress is being made. There are more successful merchants of electrical appliances than ever before and the volume of sales is increasing at a healthy rate.

To continue, the industry must continue to act as a unit, the new problems must be frankly discussed and acted upon in one accord, and strict economy in time and expenditures must be practiced. The year 1924 promises to be one of the best appliance years.

The Electric Truck—The “Super-Appliance”

By J. S. MOULTON and A. B. WOLLABER*

THAT the electric truck is rapidly coming into its town can no longer be disputed. Probably the greatest mistake was its too early birth. Years ago when all trucks were new and undeveloped, the electric made its appearance amid great applause. Poor roads, ill adapted work, inefficient motor and chassis design, added to frail battery construction, all but killed it. Then came the gas truck. Unlimited mileage and speed were topmost in the minds of transportation executives. Helped by the popularity of the gas motor car, the intricacies of gas engines, maintenance and repairs were minimized. Due to immense production, cost prices were declining even as value and efficiency were decreasing. A perspective view could hardly discern the electric snowed under.

However, there were a few far seeing manufacturers who knew that fundamentally the electric was right. Given the same engineering development, the electric would demonstrate its particular superiority for certain types of transportation. They plugged along. Electric motors and batteries were products of unlimited application and made by manufacturers of international reputation. Improvements on these items were as rapid as the use of electricity. Chassis designs were adapted from the latest gas truck practice. From the very inception of the electric truck there were many large organizations which recognized its merit and continued to use and purchase more for specialized work. Among these is the American Railway Express Company—a company that depends on economical transportation as its sole source of revenue—which today operates about 1,800 electric trucks.

With the cooperation of motor manufacturers, battery manufacturers and power companies, electric vehicle manufacturers have today produced storage battery propelled trucks which are unrivaled on the ground of economy, by any other mode of transportation. The electric, even with its relatively low speed and limited mileage, has a definite field in which it excels. As prejudice gives way to open minded investigation, as competition forces greater economy, and as corporation executives introduce cost accounting records in their methods of selecting delivery equipment, the faster will be the championing of the storage battery propelled vehicle.

At the present time the small margin of profit which exists in many industries together with the demand and necessity of reducing operating costs and thereby reducing the price differential which exists between raw materials and manufactured products delivered to the consumer, is forcing all kinds of business enterprises to take advantage of the economies in city transportation offered by the electric truck.

The increased interest displayed in keeping record of delivery costs, together with the more congested traffic and better pavements of the western cities is focusing attention on the electric street truck. Detailed investigation has shown that the cost of delivery of products which are distributed from house to house or from store to store within the cities of this country ranges from 11 per cent of the selling price for dairy products to as high as 50 per cent for ice. Realization of the large portion of the total sales price which goes for delivery must direct attention to the increased profit which can be realized through cutting this delivery cost. As it is not unusual for electric trucks to effect a saving of 40 to 50 per cent in delivery costs when used to replace horse drawn vehicles or gas trucks, the reason for the increased interest and use of the electric becomes evident.

The Field of Use on the Pacific Coast

The use of electric trucks, particularly on the Pacific Coast, is in its infancy and the field cannot by any possible stretch of the imagination be considered saturated. The sale of each and every electric truck at the

present time makes just that much easier the sale of the next truck. It is indeed fortunate that the dealers handling the various makes of electric trucks together with the battery manufacturers and a number of the power companies realize this situation and are working hand in hand toward a common goal. It has been the experience in the past that this cooperation has resulted in more and better business for everyone concerned and it is the sincere hope of the transportation bureau that such cooperation will continue and be strengthened as time goes on.

Desirability of Power Battery Load

Several of the Pacific Coast power companies have been apathetic in their interest in electric trucks, possibly neither realizing the very desirable characteristics which the electric truck battery charging load has nor appreciating the large revenue which might be built up by an active campaign to place electric trucks in their territory. The eastern power companies as a group actively foster the use of electrics and have thereby built up a very lucrative source of revenue without increasing their plant investment to any extent. The charging of the battery is done during the night when the load on the power system is below average, which means that practically no additional investment is necessary for generating equipment, transmission lines, substations or distribution lines, as electric truck garages are usually located where they can be served from existing distribution facilities.

In attempting to increase the use of electrical appliances which the power companies are convinced bring them a desirable revenue, the companies have found that they should encourage their employees, or should use themselves wherever possible, the self-same appliances. It is an accepted fact that the electric truck charging load is a desirable one and it seems difficult to understand why certain of the utilities are not using electric trucks in their operations and encouraging the use of trucks within their territory. The transportation bureau is lending its efforts in an attempt to enthrall all of the Pacific Coast companies with the desirability of making active sales efforts for the placing of electric trucks and tractors wherever they are suited to the work at hand.

Necessity for Keeping Cost Data

The lack of cost data in the past has been one of the hindrances to the wider use of the electric truck as without such information it is, of course, impossible to tell whether or not electrics are operating cheaper than horse drawn vehicles or gasoline trucks. More and more concerns are starting to keep accurate costs, however, and at least one concern on the Pacific Coast is engaged in keeping cost records at a very nominal monthly charge for subscribers who do not wish to do their own bookkeeping. This bureau can not too heartily endorse any move which will tend to increase the accurate keeping of truck operating costs as these cost records will do more than any other thing in promoting and encouraging the use of electric trucks.

“Electrics” Are Sold as Economical Transportation

Electric trucks with the various sizes and types of batteries which may be used in them comprise a very efficient unit of transportation when correctly chosen for the intended work. The electric truck should not be sold from a catalog without any investigation of the use to which it will be put, but should actually be fitted for the work at hand. The dealers handling electric trucks and batteries on the Pacific Coast sell economical transportation rather than electric trucks. It is the hope of the bureau that this will continue to be the case and that as more and more individuals become interested in this field, the growing use of the electrics will not tempt a misapplication simply for the possibility of making a sale.

Because of the fact that electric trucks are sold for particular purposes, cost figures on the operation of these trucks must be considered purely in the light of the work they are doing and compared to the cost of

*Committee on Commercial Truck Operation: J. S. Moulton, chairman; S. B. Shaw, J. Jerome Canavan, K. I. Dazey, E. A. Hunt, Harry D. Easterbrook, Frank Rettenmeyer, P. H. Ducker, H. Y. Stebbins, D. B. Rose. Committee on Batteries: A. B. Wollaber, chairman; C. L. McWhorter, L. F. Boerner, G. F. Wakeman, O. W. Lillard, Eddy Wood.

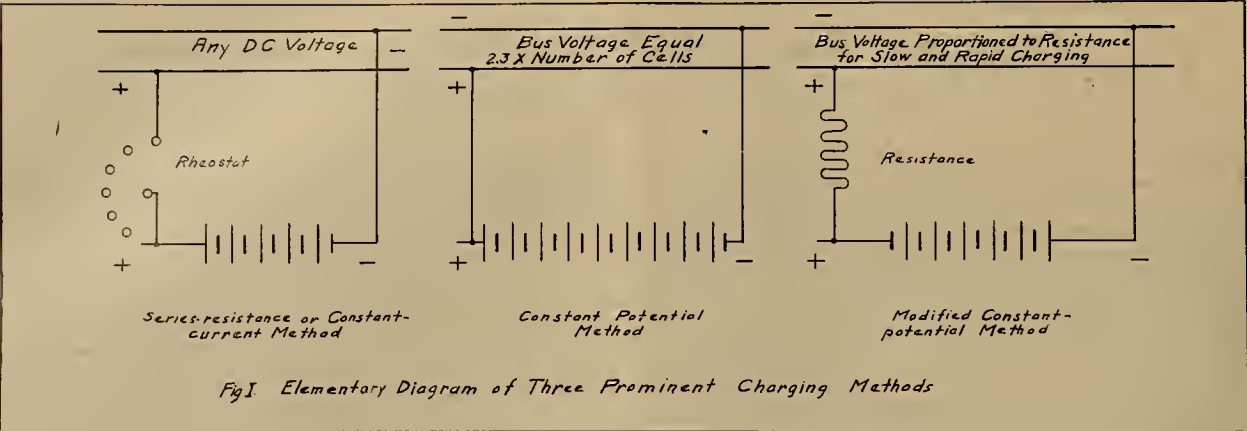


Fig. 1.—Diagram showing three methods of charging batteries.

gasoline or horse drawn vehicles performing the same work, and not compared at random with costs of vehicles doing other work under different conditions. The truck dealers are transportation engineers. Any concern having city deliveries should be interested in electric trucks. It will be to their advantage to call on a truck dealer and ask him for a report on the practicability and economy of applying electric trucks to this use.

Truck transportation is a highly specialized industry meriting the analysis of an expert where large fleets are involved. For long interurban and high speed hauls the gas truck is undisputed leader. But there is a broad field of city transportation which is characterized by moderate mileage, many stops and relatively low speed necessitated by traffic congestion which can most economically be filled by the electric truck.

Batteries in Electric Trucks

As the life and proper operation of the electric vehicle is largely dependent upon the battery, this committee has been very careful in its investigations to be guided only by what could be considered the best practice with this very important subject. It was found to be quite impossible to confine its investigations or this report to any particular make of battery because

is a fact that the majority of users of the electric vehicle in Western territory appear to be too well satisfied with its operation to give very much consideration to the preparation and keeping of cost data. As a matter of fact we could find but few users of electric trucks in this territory who keep details of cost on maintenance of trucks or batteries sufficiently accurate to serve any useful purpose at all.

Cost of Operation

Until such a time as the industry is in a position here on the Pacific Coast to obtain accurate cost data in connection with the use and operation of electric vehicles, particularly as pertains to the battery, it is thought best to consider a hypothetical case of battery cost which can easily and fairly be estimated, rather than to take the meagre data available in this connection. For example, assuming a battery for a one ton electric which costs about \$1,000 and has an average life of four years; interest at 6 per cent on the investment and power at three cents per kw.-hr., allowing for 300 working days per year and wastage of current:

Cost	\$1,000
Interest at 6%	240
Power for charging	600

Four year total\$1,840
Or \$460 per year which is \$38.33 per month per battery.

Care and Maintenance

So far as maintenance is concerned there are just four rules on batteries:

- 1. Charge properly
- 2. Flush regularly
- 3. Do not overheat or overwork
- 4. Keep dry and clean

The first item is the most important and it is the easiest to comply with if proper charging equipment is installed. A representative of the battery manufacturer should be asked to specify the type and details of equipment to be used for each power situation. If proper size and type of battery is installed in the truck by the selling agent the third item is taken care of. Cleanliness is important and easily complied with if, like flushing, it is put on a routine basis.

Charging Systems

Battery charging in the early days of electric vehicles was a very different proposition from the present day methods. Proper charging equipment today is automatic, requires no manual adjustments and absolutely protects the battery from overcharging and overheating. Direct current alone can be used for charging. If alternating current power only is available, it must be converted into direct current. This can be done by means of— (a) Synchronous converter, (b) Motor generator, and (c) Mercury arc rectifier.

There are now three methods of charging in general use. These are listed below in the order in which they came into use. (See Fig. 1.)

1. The series-resistance or constant-current method is the original charging system. It is used where an attendant is available or where the other methods might be impractical due to a great variety of battery voltages or other reasons.

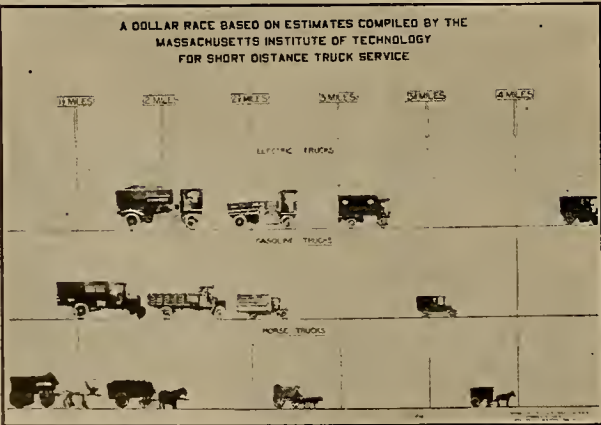


Fig. 2.—Showing distance traveled by electric truck, gasoline truck, and horse truck per dollar.

it is obvious that an injustice might be done to certain makes of batteries if due care was not taken in considering the conditions under which they were to be operated. Certain batteries are adapted to certain classes of work and one battery might well be considered a success in one line of work while if put to another test might prove to be more or less unsatisfactory. It seemed, therefore, that it would be best to approach the subject from an impartial standpoint leaving out of consideration any particular make of battery.

A great deal has already been published on the subject of batteries as affecting Eastern operation of electric vehicles, but here in the West there is an utter lack of authentic information upon which to base a report, either as regards cost of operation or maintenance. It

2. The constant-potential method was adopted many years ago and is used with considerable success in that it requires about 15 per cent less time in charging than the other methods. Any slight variations in bus voltage cause great variations in charging rate which may be harmful to the battery.

3. The modified constant-potential method is really a combination of the two foregoing methods and is very rapidly gaining in popularity. The only difference in connections is the addition of a fixed resistance. This resistance acts as a cushion to take care of "shocks." There is little doubt but that this system is the system of the immediate future.

In order to determine what kind and capacity of charging apparatus is necessary, the following information must be obtained:

- 1. Time available for charging
- 2. Number of cells and capacity in ampere-hours
- 3. Number of batteries to be charged at one time

Regardless of the method of charging used or the kind of battery charged, an automatic device for disconnecting the battery when the charge has been completed is essential and is standard equipment on all modern electric trucks. This device is merely a combination ampere-hour meter and electro-magnetic trip for opening the charging circuit. The average storage battery of good construction can usually be given a full charge in a period of approximately nine hours without deterioration or injury to the battery itself. Obviously, charging should be done without the necessity for excessively gassing the battery or overheating it, and of course the level of electrolyte or solution in each cell should cover the plates and separators in that cell.

As to the efficiency of the electric battery, the conversion of electricity from the battery into power at the

wheels is dependent upon the efficiency of the electric motor, the wiring and the transmission of the vehicle. The transmission is no less efficient than that in a gas car, and it is believed the electric motor (75 per cent efficient) is considered to be as efficient or more so than the most efficient internal combustion engine (20 to 25 per cent efficient) applicable to automotive use. Certainly when we consider that the electricity is used only when the vehicle is operating and is never allowed to run or be used when the vehicle is standing, as it is with most gasoline trucks, obviously less actual energy is wasted with the electric.

Quoting from the Electric Truck Bulletin edited by the National Electric Light Association:

"Many a hostler and stable man is today handling batteries with all of the ease and none of the worry with which he cared for and fed horses. He had rules for feeding and caring for horses. He has no more and less exacting rules for handling his batteries."

That the storage battery requires far less maintenance and attention than the gas engine is so self-evident that further discussion is hardly warranted.

The appendix to this report contains a number of cost figures obtained from the Pacific Coast concerns operating electric trucks. These figures speak very forcibly for the economy of the electric. A more graphic idea can be obtained of the economy of the electric by means of the letters which also follow this report from various concerns using them.

The bureau can report a large increase in the interest displayed in electric trucks and very bright prospects for a considerable growth in their use during 1924.

APPENDIX

COST OF SIX ONE-TON ELECTRICS IN DEPARTMENT STORE USE, LOS ANGELES, CALIF.						
Car Number.....	1	2	3	4	5	6
Charging Costs.....	\$ 12.35	\$ 20.00	\$ 17.00	\$ 18.50	\$ 13.30	\$ 12.00
Repair Parts.....	2.00	3.60	.50	1.35	3.60	3.15
Repair Labor.....	8.30	11.10	6.90	8.00	14.00	9.80
Tires.....	7.00	6.60	6.00	6.85	11.50	9.10
Body Repairs.....	15.00	15.00	15.00	15.00	15.00	15.00
Garage Overhead.....	48.00	48.00	48.00	48.00	56.00	57.50
Insurance.....	7.00	7.00	7.00	7.00	7.00	7.00
Depreciation.....	76.00	79.00	75.00	88.00	76.00	73.50
Total.....	\$175.65	\$190.30	\$175.40	\$192.70	\$196.40	\$187.05
Miles per Month.....	490	993	800	830	650	860
Cost per Mile.....	.358	.192	.219	.232	.302	.218

Costs are average for one month covering six months' period.
Depreciation figures on 20% a year, which is high for electric trucks.
Garage overhead is also high, due to expensive property used.

COST OF OPERATING AND MAINTAINING ONE TWO-TON ELECTRIC TRUCK UNDER NORMAL OPERATION OVER CITY ROUTES IN SAN FRANCISCO				
Investment		Operating Costs		
Electric Truck.....	\$2,984.25	Per Year (12,000 Mi.)		Per Mile
Battery.....	1,218.90	Battery Renewal Sinking Fund—4 Yr. Avg. Life..	\$314.10	.026175
Total Investment.....	\$4,203.15	Tire Renewal Sinking Fund—Adjust. on 10,000 mi.	268.00	.022333
		Mechanical Repairs Sinking Fund.....	120.00	.010000
		Current at 1.2c per kw-hr. 12,720 kw-hr. (1.06 kw-hr. per mile).....	152.64	.012720
		Grease.....	6.00	.000500
		TOTAL OPERATING COSTS.....	\$860.74	.071728
Fixed Charge		Cost per Year		
(Chassis Less Tires)				
Interest at 6% on Total Decreasing Investment over Period 10 Years, Average 3.2%.....	\$88.46			
Depreciation at 10% per annum.....	276.43			
TOTAL FIXED CHARGES PER YEAR.....	\$364.89			

YEARLY COSTS FOR DIFFERENT MILEAGES						
Avg. Miles per Day—300 Days per Year	Avg. Miles per Year	Total Fixed Charges	Operating Cost per Mile	Total Cost per		
				Year	Day	Mile
25	7,500	\$364.89	.071728	\$ 902.85	\$3.01	.12038
30	9,000	364.89	.071728	1,010.44	3.37	.11227
35	10,500	364.89	.071728	1,118.03	3.73	.10648
40	12,000	364.89	.071728	1,225.63	4.08	.10213
45	13,500	364.89	.071728	1,333.22	4.44	.09876
Route No.	Miles		No. of Stops	Time	2-Ton Truck Kwh.	Cost at 1.2c Mile
1.....	22.3		50	2 hrs.	21.25	.255
2.....	19.7		50	1 hr. 51 min.	22.30	.268
3.....	9.9		15	45 min.	8.50	.102
4.....	9.8		30	50 min.	9.60	.115
5.....	13.5		12	1 hr. 10 min.	14.00	.168
6.....	7.8		35	1 hr. 10 min.	10.60	.127
TOTAL.....	81.0		192	7 hrs. 46 min.	86.25	\$1.035

(NOTE.—Name of User will be Furnished upon Request.)

No. 1 1-Ton Electric Delivery Wagon in service 46 months.....	Miles	26,528
No. 2 2-Ton Electric Delivery Truck in service 39 months.....		18,910
No. 3 3½-Ton Electric Shipping Truck in service 46 months.....		17,140

EXPENSES FOR DECEMBER

TOTALS TO JANUARY 1ST

- Wages include cost of helper when needed.
- No. 3 was painted in November.
- Net profit after paying for investment and operating expenses.

Power costs based on 2c per kw-hr. to motor generator set.

Truck No.	MAY		JUNE		JULY		Total Miles 3 Months	Total Kw-hr. 3 Months	Cost of Power 3 Months	Avg. Cost per Month
	Miles	Kw-hr.	Miles	Kw-hr.	Miles	Kw-hr.				
1.....	646	1,116	658	1,079	652	1,226	1,956	3,371	\$67.42	\$22.44
2.....	645	1,119	665	1,178	683	1,194	1,993	3,491	69.82	23.27
3.....	493	912	467	776	638	1,052	1,598	2,640	52.80	17.60
4.....	931	1,530	866	1,497	922	1,793	2,719	4,820	96.40	32.13
5.....	780	1,176	700	1,096	797	1,180	2,277	3,452	69.04	23.01

No record of any repair cost.
Power figured at two cents per kw-hr.
Average days per month operated—29.

GLOBE MILLING COMPANY, LOS ANGELES
COMPARATIVE OPERATING COSTS—GAS AND ELECTRIC TRUCKS
Figures Give Average Cost per Month

Truck Number.....	55	61	62	63
Capacity.....	5-Ton	5-Ton	3½-Ton	3½-Ton
Type.....	Gas	Gas	Electric	Electric
Repairs and Maintenance				
Material (Repairs).....	\$2.20	\$2.30	.....	\$0.15
Labor (Repairs).....	4.30	2.50	.....	.....
Battery.....	.....	.....	\$0.60	.60
Power at 1.7c kw-hr.....	.....	.....	8.45	8.30
Grease.....	2.00	.45	.17	.60
Oil.....	2.08	2.00	.....	.....
Gas.....	39.30	33.00	.....	.....
Washing.....	7.25	8.00	4.80	3.50
Garage Overhead.....	8.00	8.00	8.00	8.00
Total.....	65.13	56.25	22.02	21.15
Days Operated.....	25	25	25	25
Miles per Month.....	1,173	1,127	622	667
Stops per Month.....	314	476	700	813
Tons Delivered.....	290	263	285	294
Ton-Miles.....	340,000	296,000	177,000	196,000
Unit Costs				
Per Day.....	2.605	2.250	.881	.846
Per Mile.....	.055	.050	.035	.032
Per Ton-Mile.....	.002	.002	.001	.001

Data cover average cost per month taken over six months period. No actual tire cost was obtainable.

PACIFIC STATES ELECTRIC COMPANY
ANALYSIS OF MAINTENANCE OF DELIVERY AUTOS FOR YEAR 1922

ANALYSIS OF EXPENSE PER MILE							ANALYSIS OF EXPENSE PER TON				
Total Expense	Total Mileage	Total Tonnage	Gas and Oil	Storage Repairs Sundries	Tires Tire Repairs	Total	Gas and Oil	Storage Repairs Sundries	Tires Tire Repairs	Total	Age of Truck
Portland											
Electric 21 (1 ton).....	\$ 378.33	2,606	403	.....	.1452	.....	.....	.9388	.....	.9388	1913
Gasoline 29.....	802.22	9,701	553	.0283	.0382	.0162	.0827	.4966	.6704	.2837	1921
Total.....	1,180.55	12,307	956	.0223	.0609	.0127	.0959	.2873	.7835	.1641	1.2349
San Francisco											
Gasoline 30.....	526.72	1,669	146	.0565	.2149	.0442	.3156	.6460	2.4568	.5049	1923
Electric 33 (2 ton).....	1,214.76	3,255	1,538	.....	.3732	.....	.3732	.....	.7898	.....	1913
Electric (1 ton).....	1,177.13	3,675	805	.....	.3043	.0160	.3203	.....	1.3892	.0731	1913
Gasoline.....	1,156.63	10,123	498	.0349	.0582	.0212	.1143	.7087	1.1826	.4313	1921
Total.....	4,075.24	18,722	2,987	.0239	.1752	.0186	.2177	.1497	1.0983	.1162	1.3642

NOTE.—Greater mileage results in lower cost per mile. Electric truck mileage could be increased 100% to 200% with only a fractional increase in cost. This condition does not apply in same proportion to gas trucks.
Attention is called to the relative ages of the gas and electric trucks.

COMPARATIVE COSTS OF GAS AND ELECTRIC TRUCKS IN
BAKERY USE, LOS ANGELES, CAL.

Figures taken over one year and given as average for one car month covering costs on 32 ¾-ton gas cars and 33 ¾-ton electrics.

	Gas	Electric
Repair Parts.....	\$13.00	\$ 0.25
Repair Labor.....	21.00	13.25
Oiling Labor and Oil.....	9.00	.....
Gasoline.....	18.00	.....
Power at 1.3c kw-hr.....	.....	10.00
Tires.....	14.00	6.25
Washing and Polishing.....	13.50	11.20
TOTAL.....	\$88.50	\$40.95
Miles per Day.....	85	40
Days Operated.....	28	28

Depreciation 25% per year for gas trucks.
Depreciation 10% per year for electric trucks.

(Copy)
JERSEY FARM DAIRY CO.
Tuolumne & H Streets.

Fresno, Cal.,
Mar. 20, 1924.

Electric Transportation Assn.,
San Francisco, Cal.
Gentlemen: Attention: E. J. Power, Secy.

In regard to cost of operation of electric trucks, I am pleased to state that up to the present time we have had only one case of expense other than the monthly power bill. This one expense was for replacing electrolyte in the battery of our first truck after it had operated for twenty months and covered 8600 miles. The total cost of renewal of this electrolyte will be just \$50.00.

The monthly power bills for the past year covering three Electrics, have averaged \$39.57 or \$13.19 per truck. The trucks cover between 14 and 15 miles per day and make 400 stops. They operate 30 days a month so the cost of power has been three cents per truck mile. This cost per truck mile has been at an average rate of \$.0203 per kwh.

Two new Electric Trucks started work at the end of January making a total of five now in operation.

Yours very truly,
JERSEY FARM DAIRY COMPANY
(Signed) J. Sleanham,
Manager.

COST OF OPERATING TRUCKS ON GARBAGE COLLECTION
FOR FISCAL YEAR 1922-23, PASADENA, CAL.

Gasoline Trucks	Gas	Oil	Repairs Inc. Tires	Total Cost per Mile
1918 Truck.....	.07236	.01069	.36096	.4440
1916 Truck.....	.08047	.00603	.07093	.1574
1917 Truck.....	.06950	.00541	.20899	.2839
1921 Truck.....	.02928	.00141	.07548	.1061
Electric Trucks	Charging	Repairs	Total	
1922 Truck.....	.07981	.01832	.0981	
1922 Truck.....	.09293	.06111	.1540	

(Copy)
FROM THE LABORATORY
of

THOMAS A. EDISON
Orange, N. J.,
October 17, 1923.

Pacific Gas & Electric Co.,
San Francisco Division,
San Francisco, Cal.

Gentlemen: Atten. Mr. E. J. Power.

Delivery cost at this time has assumed a greater importance than ever before.

Any merchant who keeps accurate delivery costs will purchase electric trucks for city delivery in self defense. A concern us-

ing electric trucks for delivery can undersell his competitor using gas trucks and make as much profit as a man using other kinds of delivery.

Yours very truly,
(Signed) THOMAS A. EDISON

TAE:FTR

(Copy)
OLD HOMESTEAD BAKERY

19th & Howard Sts.,
San Francisco, Cal.
March 29, 1924.

Mr. E. J. Power, Director,
Electric Transportation Bureau,
Pacific Coast Electrical Assn.,
445 Sutter St.,
San Francisco, Cal.

Dear Sir:
Replying to your inquiry asking for an opinion on the economy and efficiency of electric trucks for City delivery, we beg to say that we find electric trucks to be the most satisfactory method of wholesale bread delivery. They are as economical as horse drawn vehicles and are more economical than gas cars, and in many respects more satisfactory than either of the above mentioned.

Our entire equipment for City delivery is comprised of (45) electric trucks. A few of these have been in operation for (10) years and are still rendering very excellent service. We strongly recommend electric for City deliveries.

Yours very truly,
OLD HOMESTEAD BAKERY, INC.
By (signed) H. A. Banzhaf
Vice President.

(Copy)

GENERAL ELECTRIC COMPANY
General Office

Schenectady, N. Y.

San Francisco Office
Rialto Building
San Francisco Warehouse
361 Bryant Street
April 24, 1924.

Mr. E. J. Power, Chairman,
Transportation Bureau,
Commercial Section, P. C. E. A.,
445 Sutter Street, CITY.

Dear Sir:
Replying to your favor of March 27th will state we have been using three electric trucks for the past twelve years and have found them satisfactory in their entirety for our drayage service. During these twelve years we have had a minimum amount of trouble with a maximum service.

In the City, the electric truck is the most economical unit to operate because its costs can be accurately calculated and the element of doubt removed. This making it possible to write off all operating charges as fixed charges.

The electric truck meets our requirements of stability and speed better than any other method of transportation, at a cost of from 25% to 50% lower. It travels as rapidly as is consistent

with safe driving, maintaining a high average of speed due to its quick acceleration and ease of control, while its dignified appearance and noiseless operation makes an impressive advertisement for its owner.

In closing, let me again call your attention to the long life, dependability and economy of operation of our three trucks. "The proof of the pudding is in the eating."

Very truly yours,
(signed) H. L. Nagel
MGR. S. F. WAREHOUSE

HLN:HAS

BURR CREAMERY CO., LOS ANGELES, CAL.
COMPARATIVE COSTS OF GAS AND ELECTRIC TRUCKS IN
DAILY USE

Costs are Average Cost per Car per Month Covering Operation of
49 Gas and 44 Electric Trucks

	Gas	Electric
Total Labor per Month.....	\$ 63.00	\$15.60
Total Parts per Month.....	35.00	6.00
Oil and Gas.....	39.00	
Power Cost.....		12.69
Depreciation.....	30.00	30.00
Total.....	\$167.00	\$64.29

All cars average 35 miles per day.
Depreciation figured on cost of \$4,000.00 for electric and \$750.00 for gas.

ALFRED ICE CO., LOS ANGELES
Costs of Electric Trucks in Ice Cream Delivery for One Year

	No. 38	No. 40
Cost of Power.....	\$ 85.52	\$ 75.53
Repairs and Distilled Water.....	57.43	72.83
Other Costs.....	7.44	7.41
Total Operating Cost.....	150.39	155.80
Miles per year.....	4,547	3,992
Gallons delivered.....	53,115	46,870
Cost per Mile.....	.033	.040
Cost per Gallon.....	.0028	.0033

ICE DELIVERY IN FRESNO
Costs of 2-Ton Electrics for One Year

	No. 1	No. 2
Power Cost.....	\$ 31.90	\$ 31.90
Distilled Water Cost.....	5.75	5.75
Garage Labor.....	107.18	106.74
Lubrication.....		.17
Lighting System.....		.73
Rear Assembly.....	.73	4.62
Top and Body.....		.52
Insurance.....	42.03	53.83
Sundries.....	24.22	35.15
License.....	20.00	20.00
Total.....	\$ 231.81	\$ 259.41
Cost per mile.....	.092	.113
Driver's Pay.....	1,688.53	1,629.26
Cost per Ton Delivered.....	1.69	2.57
Miles Run.....	2,522	2,289

Electric Industrial Trucks and Tractors as Revenue Builders for Central Stations

By E. J. POWER*

IN practically every line of business, one of the many problems which may arise is that of inter-departmental transportation in one phase or another. Increasing costs of labor and the demand for speed in material handling, as well as lower insurance rates, better building ventilation, and cleanliness have resulted in the development of the electric industrial truck and tractor for handling material in manufacturing plants, warehouses, steamship docks and railroad freight terminals. Fundamentally it is the desire of every man in whose hands the efficient management of the business is placed, to move the material in the quickest possible time, and with the minimum amount of labor. These executives are attaining their objectives through the help of the electric industrial truck and tractor as evidenced by the thousands that are now in use. These little vehicles are proving themselves indispensable in this work to operators who need a cheaper and more efficient method of moving material as they are small enough to negotiate narrow aiseways, yet sufficiently powerful to move heavy loads easily and speedily.

As there seems to be a very decided lack of knowledge as to just what these little "electric jitneys" are,

this committee believes it well to briefly describe the common types in use.

The Tractor

Usually the tractor is not designed to carry cargo upon its body. Its whole purpose is to haul trailers, by means of which loads of incredible weight are easily drawn. Where the loads are extremely heavy or the roadway poor, the greater tractive ability of this type of vehicle will be instantly recognized—especially in the four-wheel tractor. One tractor will often displace from two to five horses in yard work, operating with much less care and supervision and costing less to operate than the feed of one horse.

Undoubtedly when long strings of express trailers have been seen being pulled through freight sheds or railroad warehouses or industrial plants it has caused wonder at the ease with which the little tractor at the head handled the load. However, to the initiated this ease of operation is no surprise as they know just how ruggedly and compactly these machines are built.

An excellent example of the brute strength of these "electric jitneys" happened just recently when a tractor pulled a string of 23 trailers weighing 4,000 lb. each, off of one of the Southern Pacific ferry boats at extreme

*Report of Transportation Bureau: E. J. Power, chairman; J. O. Case, H. K. Griffin.

low tide. This necessitated climbing a ramp pitched at a 45-deg. angle from the deck of the ferry boat to pier level. It is easy to imagine that it would be no trick at all for a machine that could pull as great a load as just mentioned, to pull a box car or two, and at various times they are called upon to do that very thing. It is a simple way to spot a car and can be done at the will of the operator without waiting for the switch engine. Besides these tractors, there are many other types of electric trucks for handling baggage, merchandise, and raw material in all kinds of industrial plants, storehouses and terminals.

Elevating Platform Trucks

The value of this type of electric industrial truck is recognized through its ability to use small platforms or skids. A skid is loaded (if desired, up to 6,000 lb.), the truck is run under it and at the touch of a lever, the base of the truck raises the loaded skid clear of the floor. The loaded skid is then delivered to the point desired to be unloaded, lowered, and the truck immediately withdraws from under the skid so that the truck is able to make another trip with a load to the point of delivery within a very short time. This method of hauling is not subject to delays incident to loading and unloading but can be kept in continuous operation. This type of truck is practically indispensable to any industry, as these and similar operations are continually repeated in warehouses, factories, and other manufacturing establishments. Today this type of electric industrial truck is used in over 250 branches of industry.

In the early part of 1916, the late Capt. William Matson, president of the Matson Navigation Company, and Capt. Charles Saunders, who was then general superintendent of that company, took a very active interest in reducing their stevedoring costs by means of electric industrial trucks. At that time there were very few electric industrial trucks in use in San Francisco, and even those in use had not been in use long. Therefore, almost no data were available, indicating what saving, if any, might be expected through the use of this comparatively new type of stevedoring trucks.

In order to gather more accurate data, a demonstration lasting several weeks was made to the Matson Navigation Company at Pier 28, and although a considerable amount of opposition was met with, the final result was that one truck was purchased for immediate delivery and three more were ordered to be delivered as early as possible. Some time elapsed after these first four trucks were put into service before extensive and general use was made of the trucks, but after two years of service, they seemed to have found very extensive use, and from that point on, the fleet was added to at frequent intervals.

One of the latest applications is using the trucks in the bottom of the ship's hold to bring the freight in much larger units up to the hook than heretofore was possible by hand methods. It is a well known fact that any kind of equipment suitable for general stevedoring work must be of a very rugged and substantial type, and further, that failures in service are serious on account of the value of the ship's time.

It is significant that electric industrial trucks and tractors are not only extremely simple in operation, making them a practical apparatus to put in the hands of the average longshoreman, but considering the very severe nature of the work which they are called upon to do, are of remarkably long life. Several of the electric trucks in the Matson Navigation Company's fleet have seen more than six years of service. There is also a considerable number of trucks owned by other steamship operators, which trucks have seen from five to seven years of service.

After the Matson Navigation Company had had the first four trucks in service for something like two years, and before they made extensive additions to their fleet, they determined that an average and fair comparison between the cost of moving freight by hand and electric truck methods be made. The results are shown in Table I.

In further explanation of the table, it will be noted that nine men were used; this is because the object almost universally sought for is to move the goods as quickly as possible, therefore using as many men as can be economically handled on any given job. It was found that in keeping the platforms loaded as fast as the truck could handle them that oftentimes from five to ten men could be used to advantage to keep one

electric truck of the so-called elevating, or lift truck type, constantly busy moving loaded platforms. As a result of this a considerable portion of the electric trucks owned and operated by the several larger steamship companies in San Francisco who do their own stevedoring are of the lift type because of the comparatively greater amount of work which can be performed with this type of truck.

TABLE I
Electric Industrial Trucks vs. Hand Loading
Matson Navigation Company

	11 Men and Hand Trucks	9 Men and 1 Electric Truck
Time required.....	1 hr. 55 min.	1 hr. 10 min.
No. cases handled.....	1,050	1,140
Distance moved.....	500 ft.	400 ft.
Cars loaded.....	1	1
Cost.....	\$13.20	*\$7.05

*Includes all cost items—labor, etc., including depreciation.

After the above comparisons, both as regards time required and cost of handling freight by electric lift trucks as compared to hand methods, the Matson Navigation Company added to their fleet at frequent intervals until they are now operating thirty-six electric trucks.

Tier Lift Truck

There is a very wide range of usefulness for the tier lifting truck. Where containers are stacked in tiers or where trucks, box cars, etc., are to be loaded, this truck can be operated efficiently with the minimum of lost motion. The platform is raised to the desired height by power from the battery; then the truck is driven into position and the load is easily transferred. With this type of truck a 4,000-lb. load can be raised seventy-six inches in one minute, thirty-seven seconds. This machine, by doing the heavy lifting heretofore done by man power, makes the work of the men easier, thus reducing the labor turnover and accidents, which is a big factor.

Many factory executives have undoubtedly seen the little electric in operation at railway terminals and have admitted they were a good thing, a necessity under present day standards of efficiency, yet they may not have realized that the use of similar trucks and tractors, perhaps a type more applicable to their individual requirements, might prove just as effective in their own plants as in the railroad terminal.

The Portable Crane Truck

The field of usefulness of this type of industrial truck is very broad and applicable to every industry where heavy parts or packages must be lifted. It lifts heavy members in erecting shops, places large castings on machine beds, and is an important tool for railroad shops and roundhouses for handling car wheels, steel billets, etc., difficult to handle by man power. It is pertinent to discuss the possibilities and the potential market for these vehicles. It is very difficult to determine the number of industrial vehicles in use at the present time, but from information gathered by the committee, it is believed that approximately 15,000 machines of all types are now operating. The efforts of the manufacturers in the past have been spent mainly in making straight, simple applications where no serious education or plant changes are involved, and regretfully so, as several times the quantity of vehicles now in use can be used economically without creating new types or making expensive plant changes.

Today a warehouseman may not be a buyer because his elevator is too small or light, his aisles too narrow, his roadway too soft, or his scales too small. However, he is sure to be a buyer in the near future as his business requires the handling of merchandise in volume. It is only a matter of time until this executive head finds an opportunity to make the changes necessary in his plant for the more efficient method of handling his commodity. The economic strife for his existence will force him to the use of labor-saving machinery and the electric industrial truck and tractor are the only kinds possessing the necessary flexibility for general use.

Central Station Interest

Twenty years ago, central station companies were selling practically no electricity for motive power purposes, while today there is being consumed over

200,000,000 kw-hr. of off-peak current per year. This considerably flattens out that valley which existed in the load curve and at the same time it returns a revenue, at 2 cents per kw-hr., of \$4,000,000 per year, certainly a return worthy of serious consideration. A very large proportion of this revenue is produced by the electric industrial truck and tractor. The batteries vary with the different types of trucks and tractors and the service for which they are used, but a conservative estimate of the average amount of charging current required per truck per day is 20 to 25 kw-hr. or 6,000 kw-hr. per year. The total yearly consumption of 15,060 machines is, therefore, approximately 90,000,000 kw-hr. At a conservative power rate of 2 cents per kw-hr. the central station income from this source exceeds \$1,800,000 yearly. This is off peak, high power-factor load which, of course, is several times as desirable as peak-load business from the net profit standpoint.

There are now in operation in California approximately 300 industrial trucks and tractors, as shown in Table II, and basing this number of trucks on the figures quoted above, the yearly return to the central station is approximately \$60,000. As this is off peak-load, its value to the central station, from a standpoint of net profit per year, might be considered equivalent to a gross sale of \$240,000 per year of peak-load current.

Central Station Assistance

While primarily the central station's business is the supplying of current and not the sale of electric indus-

trial trucks and tractors, there is little doubt that they are in a position, without a great deal of expense, to contribute materially to the rapid growth of this industry by forming an electric truck bureau to use its influence on behalf of truck promotion. This bureau can readily disseminate information in the form of circular letters, active solicitation, etc., and other local means which will occur to a live man. The gross revenue from the sale of current used by an electric industrial vehicle throughout its life is about equal to the original cost of the machine.

As electric energy is the most efficient and economical power of the twentieth century, transportation service should be performed "ELECTRICALLY."

TABLE II.

Electric Industrial Tractors in Use in California

Steamship and municipal docks.....	70
U. S. Government in air service, navy yards, arsenals, army posts and docks.....	36
Food products.....	35
Brick and tile yards.....	26
Paints, oils and chemicals.....	24
Railroad shops and freight yards.....	23
Ship building plants.....	22
Iron, steel and wire works.....	13
Lumber industries.....	12
Warehouses.....	11
Express companies.....	9
Tractor manufacturers.....	8
Glass factories, moving picture plants, tire manufacturers, automobile manufacturers, flour mills, fruit packers, etc.	11
Total in operation in State of California.....	300

Some Facts About Street Lighting

By G. H. P. DELLMAN*

THE ever-increasing demand for street lighting has caused those who are responsible for the expenditure of public money to wonder if, after all, it is really necessary. Why should an appreciable portion of the community's funds be yearly spent on street lighting? In other words, why are streets lighted? While this at first seems a somewhat simple question, yet there are many people who are unaware what their street lighting system really means.

Primarily, streets were lighted as a protection against crime. It is a matter of record that over 98 per cent of all crimes committed on the street are after nightfall, and the majority of these in dark places. The better the street lighting, not only of the thoroughfares but also of the side streets and alleys, the better will be the police protection and the harder it will be for a crime to be committed and the criminal to escape under cover of darkness.

A proper street lighting system not only affords police protection, but prevents accidents. Everyone recognizes the necessity of the auto, and the consequent higher speed traffic conditions over those of a few years ago. This auto traffic naturally creates an accident hazard at night which menaces human life.

The immense value of high-speed traffic brought about by the use of automobiles has caused an enormous increase in traffic accidents. A careful study based on accident statistics from thirty-two cities shows that 17.8 per cent of all night traffic accidents are due to inadequate illumination. Evaluated, this represents an annual property loss of at least \$54,000,000, in addition to human misery, loss of life and enforced care of dependents and those permanently disabled. On the other hand, according to census reports, the total expenditure for street lighting in the United States does not exceed \$50,000,000 per year.

This was clearly demonstrated during the World War, when several cities who turned off their street lights to save fuel, turned them on again to save life and limb. During the period from 1917 to 1919, fatal accidents in the daytime increased only 6 per cent, while at night they increased 21 per cent. Similarly, non-

fatal accidents increased 34 per cent in daylight and 63 per cent at night.

In the State of California the tremendous growth of automobile traffic is shown by the increased number of motor vehicles in use:

1920	532,934
1921	645,522
1922	823,594
1923	1,002,356

This shows clearly the changed conditions which demand that the streets of our cities be made safe and convenient at night.

It is significant, also, that property values the world over are considerably higher on highly lighted streets than on dark ones. In the cities of California wherever there exists a "White Way" or highly lighted street, property values exceed that of other business streets by thousands of dollars per front foot. Also, rental values are correspondingly greater. The reason is plain, when it is considered that people are attracted to a highly lighted thoroughfare and crowds will always be found on that street, and values of property are always dependent directly upon the number of people who pass.

Not always is the commercial aspect of property considered, but it is frequently more desirable to create beauty. This is particularly true of parks, boulevards and residence sections. If the avenue presents a bright appearance at night the surroundings are attractive. If darkness prevails, however, the architectural beauties of the structure are effaced completely and the section is shunned.

Review of Street Lighting Practice

Although there is record of primitive man using torches to light his path, the first authentic street lighting was practiced by the Romans, about 200 A.D., who suspended oil vessels with a wick, at the public squares. This was neglected in the middle ages, however, and it was not until the year 1524 that street lights again appeared, in Paris, when the authorities ordered a tallow light to be displayed from every window in certain streets. Tallow and oil lanterns and other improvements appeared in London and Berlin until the gas lamp of 1792, which was used until the advent of the

*Sub-Committee on Street and Highway Lighting: G. H. P. Dellman, chairman; R. H. Manahan, vice-chairman; H. H. Allison, Ray Conlisk, H. K. Griffin, O. J. Helvey, H. N. Johnson, C. E. Johnson.

first electric arc lamps in 1879 in Cleveland. These arc lamps consisted of sticks of carbon which emitted a very bright light when brought together in an electrical circuit. This was later perfected by surrounding the carbons in glass, which was known as the enclosed arc.

Ten years later the magnetite arc was invented, which differed from the arc only in the material of the electrodes. By using a composition material, the electric arc created gave out a far better light than was obtained from the carbon.

At about this time the carbon incandescent lamp made its appearance, but was not satisfactory for street service. With the invention of the Tungsten filament, however, a light could be obtained which was equal in every respect to that of the arc. Today the incandescent lamp is universally used, and is replacing the arc lights except in the great "White Ways" of the metropolis.

The early gas lamps were located on posts along the streets at convenient intervals, and men were employed to light them each night.

The first electric lights were suspended in a high tower, illuminating the entire area. As methods of distribution by wires were introduced, they were suspended over the center of the street at points where they were needed. Gradually, the incandescent lamps were used on a bracket from a pole suspended over the street in the same manner as the arcs. From this grew the custom of placing several incandescent lamps, enclosed in glass globes, on a post located at regular intervals along the street, which were known as "clusters." The perfection of the high power gas filled Mazda lamps made it possible to substitute one lamp in a decorative glass top on the post, in place of the cluster of lamps. This is our modern "electrolier" or "ornamental standard" system of lighting which is now being used by all progressive communities. In many places where the nature of the street does not permit the use of the standards, the "ornamental brackets" are used. This consists of adapting the electrolier tops onto the bracket attached to iron trolley poles, or the wooden poles on the street.

In "White Way" lighting, both the luminous arc and the high intensity incandescent lamps are used.

The development of the modern illuminants has brought several changes in the methods of wiring and most of the new systems are wired by what is known as the "series" system. This consists of one wire running through each lamp before completing the circuit, and results in considerable economy over the multiple system, which employed two or more wires. The series system uses a high voltage circuit and the multiple a low voltage, which is not as economically distributed to the lights.

Modern Practices

The foregoing explanation is intended to show the changes which street lighting systems have undergone in the past years, and will offer a ready explanation as to why so many types of street lighting may be found in the same city. Heretofore these cities did not have any definite plan of development, nor was much attention given to street lights. Consequently, every new political faction used the lighting system it saw fit, resulting in most cases in three or four different systems which did not harmonize or furnish correct illumination. Today, most communities have some definite plan of development outlined, which should be taken into consideration in planning any street lighting system. If no plan exists, then by all means one should be established to enable securing good street lights.

It is obviously undesirable to use the same street lights in a residence section as a business section, and vice versa. So the city should be classified for an intelligent scheme of lighting. This classification will naturally differ for smaller or larger places. For cities such as exist in the State of California, a suggested classification is outlined:

Class I—Cities of less than 1,000 inhabitants

- (1) Main business street
- (2) All other streets

Class II—Cities of 1,000 to 3,000 inhabitants

- (1) Main business street
- (2) Secondary business street
- (3) All other streets

Class III—Cities of 3,000 to 5,000 inhabitants

- (1) Main business street
- (2) Secondary business street
- (3) Boulevard or residential thoroughfare
- (4) All other streets

Class IV—Cities of 5,000 to 10,000 inhabitants

- (1) Main business street
- (2) Secondary business street
- (3) Residential thoroughfare
- (4) Side streets of districts
- (5) All other streets

Class V—Cities of above 10,000 inhabitants

- (1) Main business street
- (2) Secondary business street
- (3) Boulevards or residential thoroughfare
- (4) Side streets or residence districts
- (5) Cross-town arteries and thoroughfares
- (6) Wholesale or manufacturing districts (if any)
- (7) All other streets

Main Business Street: The main business street should naturally be the brightest lighted street in the city, and the size of the city will govern the size and type of illuminants employed. As this street will bear the heaviest traffic, it should provide lighting which will afford safety and convenience to the public.

Secondary Business Street: The street system should be of the same general type, but need not be as highly illuminated as the main business section. The same spacing and type of equipment should be used, however, so that when this secondary business street develops to the point where conditions warrant, the higher power illuminants may be supplied.

Boulevards and Residential Thoroughfares: This section of the city will require some type of ornamental lighting which the surroundings will largely determine. If this street is very broad, the lights should be so placed as to illuminate the entire street surface and yet not cause a glare. The amount of illumination provided will be governed by the amount of traffic.

Side Streets or Residence Districts: Side streets and residence districts have much the same lighting requirements, and the function of the illumination of these streets is merely to afford police protection and safety. As there is not apt to be any traffic on these streets, the main consideration is that of lighting up the dark areas to a point where the pedestrian can discern objects at a distance.

Cross-town Arteries or Thoroughfares: Streets of this nature are found only in the larger cities and are, in effect, secondary business streets. At least they have considerable traffic and should be adequately lighted. A system of the same nature as suitable for the secondary business district will serve in these streets.

Wholesale or Manufacturing District: This part of the large city is usually deserted at night, but affords excellent opportunity for thugs and robbers. It is customary to place a very high powered light at intersection of streets and wherever necessary to light a dark area along the street front so that the pedestrian is not in danger of a person springing upon him from the shadows.

All Other Streets: These streets are for the most part residential, and should be lighted to a degree that will afford police protection and safety at crossings or other danger points. The streets falling in this classification comprise the major portion of the city and a definite plan should be adopted as to a uniform system. In general, the equipment used will not be as expensive and intensities will be lower than on the more important streets.

Essential Features of Proper Street Lighting

Of all the methods of street lighting which have been used, there are only three systems which are in use today:

- (1) The overhead system, consisting of incandescent lamps suspended over the center of the street.
- (2) The pole bracket system, consisting of incandescent lamps mounted on a support from a pole on the side of the street.
- (3) The ornamental standard system, consisting of either arcs or incandescent lamps mounted on ornamental poles or brackets along both sides of the street, and equipped with decorative glass globes.

The center suspension system is used in the more important streets where the ornamental type is not employed. The light source may be of any size, and is suspended at a height of 20 to 25 ft. over intersections, in a manner that gives adequate light on all the streets at a considerable distance. This system has a distinct advantage over the type mounted along one side of the street, in that trees and shrubbery do not obstruct the light and create dark areas. Also, greater efficiency is obtained by overhead units than by any other type.

The ornamental type is used for "White Ways," business sections, parks, boulevards and other thoroughfares which justify the best systems obtainable. Any degree of decoration and light value may be obtained by this system, which is considerably more expensive to install than any other.

Any street lighting installation should conform to a predetermined plan, and be in accordance with the classification outlined above. Thus, whenever any changes or additions are made, old equipment may be used in other parts of the city and the new equipment will be the same as already in use.

Any street lighting system should be planned to give the desired light with the greatest economy. In some instances a few high candlepower lights will be more desirable than many small ones, and vice versa. The use of less than 2,500 lumen lamps is not recommended.

An overhead system will give adequate light in many instances where an expenditure for ornamental standards is not desirable. In providing light for side streets, proper sacrifice for intensity and decorative value must be made for the important thoroughfares. Proper heights and spacings must be observed with the surroundings in accordance with the economy involved. Thus a portion of a main thoroughfare may not require nearly such intensive lighting as the other end of the same street.

Due foresight must be taken to provide facilities which will take care of growth and improvements. Sufficient allowance must be made in the distribution system to supply current for larger lamps if desired. In ornamental designs, when initial expenditure is heavy, provision should be made to use higher candlepower lamps in the future without appreciable increased cost. It is customary to provide equipment which will take care of the lighting when the city has grown 50 per cent larger in population. The proper selection of equipment should be made in order that the desired effects will be accomplished. That is, proper light directing globes and refractors must be used for certain purposes, and again, certain heights must be observed to gain proper distribution of the light.

In general, the larger the light source, the higher from the street level it should be mounted. Wide streets also require higher mountings than narrow ones, to throw the light a greater distance. In the business and white way districts, the light should be directed to the front of the buildings as well as the street, while in the residence districts, light on the buildings is objectionable.

If then, as in some instances, upward light may not be as necessary and it is more essential to get the upward light down on to the ground, or in other words into the lower hemisphere as it is called, then a reflector or some other type of equipment for re-directing the light downward must be used.

The ornamental system of lighting utilizes four kinds of posts, (1) Cast iron, (2) Pressed steel, (3) Wooden pole, (4) Concrete. The cast iron post is extremely durable and readily lends itself to ornamentation. The pressed steel is light and flexible, and the posts serve as shock absorbers to the lamps and glassware. The wooden pole is extremely useful where it is desired to mount the ornamental brackets without the expense of the metal standards. The concrete post is desirable in some instances. The ornamental glass globes which enclose the light source and surmount the pole are manufactured in a multitude of designs.

In general there are three shapes of glass tops used in the ornamental standards:

- (1) Urn shaped
- (2) Acorn shaped
- (3) Lantern or panelled

These shapes may be obtained in various densities of opal glass, or in rippled or rectilinear glass as desired.

The opal glass diffuses the light in accordance with its density. The rippled and rectilinear glasses diffuse, but do not absorb as much light and give a sparkling effect. The following table gives a range of the absorption qualities of the various densities of glass:

Designation	Per cent Transmission	Per cent Loss
Clear	90 or more	10 or less
Very light density	85 to 90	15 to 10
Light density	75 to 85	25 to 15
Medium density	60 to 75	40 to 25
Heavy density	50 to 60	50 to 40
Very dense	50 or less	50 or more

The round ball globe which was used in the cluster system does not change the direction of the light, merely diffusing it, hence it is not used in modern systems. The various shapes outlined, each directs the light in a different manner and the individual case will determine the proper shape which is adapted to any degree of decorative value.

Methods and Financing of Street Lighting

If a corporate city desires to light the streets, the city government may spend as little or as much as it sees fit for that purpose. If certain portions of the city desire more lighting equipment than provided by the city, a lighting district may be formed under the law, and additional expenditures made in that district. If communities outside of corporate limits desire lights, they again have recourse to the lighting district. In the State of California there are three groups of statutes governing the formation of the lighting districts within corporate limits:

- (1) Street improvement statutes providing for assessment upon a frontage or district basis. The "Vrooman Act of 1885," "Improvement Act of 1901" and the "Improvement Act of 1911," are in this classification, the latter being generally used.
- (2) Taxing District statutes created for improvement purposes upon petition and vote of the district. The "Municipal Improvement District Act of 1915" and the "Municipal Tax District Act of 1919" come under this classification.
- (3) Statutes creating districts by the City Council for improvement purposes. The "Acquisition of Public Utility Act of 1913" and the "Street Lighting Act of 1919" come in this class.

The provision for districts outside of incorporated limits is known as the "Highway Lighting District Act of 1909." There is quite a lack of definiteness in this act, which confuses the issues with the newly developed highway lighting systems.

Failures of the Past

It might be well to enumerate the most glaring faults of the existing street lighting systems, so that future installations may be thereby benefited.

- (1) The most common mistake of the past is the inadequate amount of illumination.
- (2) The lack of uniformity resulting in a miscellaneous lot of equipment which cannot be changed or improved.
- (3) The leaving of gaps between systems in different sections and on the same streets.
- (4) Lack of standardization of equipment and types.
- (5) The tendency to make temporary and makeshift constructions which are dangerous and expensive to operate.
- (6) Making provision for "moonlight" and "part night" burning, instead of designing the system to meet the available funds.

Traffic Lighting

There are various systems of lighting designed as an aid to congested traffic conditions which have proved the solution of very difficult situations. A system of traffic towers is used to utilize projectors which can be seen for a mile or two away, thereby regulating traffic on the entire street. The flood light is used to throw its beam on the traffic policeman, whereby his movements can be seen at considerable distance with ease. Flashing devices are used to denote safety zones and rail crossings, which are particularly useful to the strangers within the city. All of the many traffic indicating devices at intersections use lights for their effectiveness.

Highway Lighting

The tremendous increase in the number of automobiles in California, and the great system of highways, have created a situation which is rapidly growing acute. The highways are becoming more crowded and the speed greater. Also the headlight glare is becoming more and more of a menace to life and limb. The natural solution of this is the lighting of the highways with

highway lighting units. There are at present two successful lights manufactured for this purpose. These are also adapted for lighting long lanes and dark alleys where it is not practical to use street units. They throw a light a long distance and dispel the shadows where danger lurks.

Conclusion

A scientifically derived, comprehensive and far-sighted street-lighting program correlated with a city zoning plan, is not easily worked out. It calls for specialized talent in many lines of work, and in most cases city officials can profit by bringing into consultation the engineers found in the organizations of public utility companies, whose success depends largely upon their ability to foresee future requirements, and to meet them with a minimum loss in reconstruction. This nation is becoming possessed of many large cities, and most of them have in the past been more or less like "Topsy,"—they just grew.

APPENDIX A

In order to assist in the proper laying out of street lighting systems, this Committee has prepared the following data:

RECOMMENDED PRACTICE IN ORNAMENTAL STREET LIGHTING SYSTEMS

Type Street	Size Unit Lumens	Number Lamps	Mounting Height Ft.	Spacing Distance Ft.	Hours Burn	Operation Paid For
Parks	2,500	Single	12 to 15	100 to 150	A.N.	City
Boulevards and Residence.....	4,000 6,000 Luminous arc			Staggered		
Secondary Business and Traffic Thoroughfares	4,000 6,000 Luminous arc	Single	13 to 16	100 to 150 Staggered or Opposite	A.N.	City
Main Business Streets.....	4,000 6,000 10,000 15,000 Luminous arc	Single or Double	13 to 18	80 to 125 Opposite	A.N. A.N. and M.N.	City
White Ways	10,000 15,000 25,000 Luminous arc	Double	18 to 24	80 to 125 Opposite	A.N. and M.N.	City and Property Owners

Ornamental systems should operate on a flat monthly rate including renewals, operation and maintenance by the public service company. Ornamental lighting standards should be installed and owned by the property owners; underground distribution system should be installed and owned by property owners or power company as desired by the interested parties. Ornamental lighting standards should conform to architectural structure of buildings, width of streets, and character of communities.

Foundations should be of sufficient weight and size to support safely in an erect position the standard to be installed. Minimum size for solid concrete is 24 in. x 24 in. x 30 in.

Lamp Renewals

Very careful study has been given to the matter of lamp renewals, and there seem to be no definite data at hand for determining when a lamp has reached its useful life. Most of the utilities serving street lighting systems where they are responsible for maintenance, do not renew lamps until burn-out occurs. If we are to create a favorable impression and keep the good will of a community, this practice should be discontinued.

This Committee is not prepared to offer a scientific method for determining when a lamp has reached a predetermined loss in efficiency, but it believes that it is practical to do this by experienced observation. This will at least forestall criticism by the inexperienced observer.

Mounting Heights

As this Committee has recommended against the use of less than 2,500 lumen lamps, these recommendations are based on lamps of 2,500 lumens or over.

2,500 lumen lamps	20 to 25 ft.
4,000 lumen lamps	25 to 30 ft.
6,000 lumen lamps and over	30 to 35 ft.

Where bracket types of fixtures are used, care should be taken to mount them so that the reflectors are mounted in a horizontal plane.

Cleaning

Definite schedules for cleaning should be adopted, these varying with different localities.

Recommended Practice for an Overhead Street Lighting System

APPENDIX B

(1) Lamps of less than 2,500 lumens (250 cp.) are not economical when used for street lighting. The cost of lighting is about one-third more than the next smaller size, i.e. 1,000 lumens (100 cp.) and the effective illumination two and one-half times greater.

(2) Do not use a lamp any larger in size than 2,500 lumens until a light unit of this size has been provided for each street intersection in the built-up district, for each point where a street crosses a steam railway at grade, and on a 15-times-the-mounting-height spacing along each important traffic street outside the built-up district.

(3) If the street lighting appropriation is more than sufficient to meet the conditions of (2), increase the size of light unit on important thoroughfares to 4,000 lumens.

(4) If the appropriation is more than sufficient to meet the conditions of (3), increase all the units to 4,000 lumens.

(5) If the street lighting appropriation is more than sufficient to meet the requirements of (4), install intermediate units of 2,500 lumens on all blocks of the built-up districts in length exceeding 20 times the mounting height (two intermediate units if lengths exceed 32 times the mounting heights).

(6) If the street lighting appropriation is more than sufficient to meet the conditions of (5), increase all intersection units to 4,000 lumens.

(7) If the street lighting appropriation is more than sufficient to meet the conditions of (6), increase all intersection units to 6,000 lumens.

(8) If the street lighting appropriation is more than sufficient to meet the conditions of (7), provide a spacing of eight times the mounting height on all important traffic streets within and without the built-up district, using thereon 6,000 lumen intersection lamps and 4,000 lumen intermediate lamps within the built-up district and 4,000 lumen lamps throughout, outside the built-up district.

(9) If the street lighting appropriation is more than sufficient to meet the conditions of (8), provide a spacing of eight times the mounting height throughout the built-up district. Use 6,000 lumen lamps for all intersections, and 4,000 lumens for intermediate units.

(10) If the street lighting appropriation is more than sufficient to meet the conditions of (9), employ 6,000 lumen lamps throughout at the 8-times-the-mounting-height spacing.

APPENDIX C

In general there are three groups of state statutes under which a lighting district may be formed in incorporated cities of California. These statutes also apply to chartered cities unless other provision is especially made in the charter.

- (1) Street Improvement statutes providing for assessment upon a frontage or district basis. The "Vrooman Act of 1885," "Improvement Act of 1901," and the "Improvement Act of 1911" are in this classification, the latter being generally used.
- (2) Taxing District statutes created for improvement purposes upon petition and vote of the district. The "Municipal Improvement District Act of 1915" and the "Municipal Tax District Act of 1919" come under this classification.
- (3) Statutes creating districts by the City Council for improvement purposes. The "Acquisition of Public Utility Act of 1913" and the "Street Lighting Act of 1919" come in this class.

Class I

The "Vrooman Act of 1885" and the "Improvement Act of 1911" are very similar and provide for the installation of a lighting system, but not for its operation. Under these two acts the legislative body of an incorporated municipality may take the necessary steps to establish a street lighting system "Whenever the public interest or convenience may require."

These two acts provide two alternative methods of assessment and two alternative methods of payment. The assessment may be either according to frontage or according to the district benefited. Assessments may be paid within thirty days, or bonds may be issued against the assessed property in accordance with provisions in these acts. The "Improvement Bond Act of 1915" which can be used in conjunction with either act, provides that all property subject to assessment is subject to a lien for payment of all bonds, whereas the other acts provide for the issuance of bonds against individual pieces of property.

The general procedure under these acts follows:

- (1) The council must pass a resolution of intention to do the specified work.
- (2) Notices must be posted and published for a couple of weeks.
- (3) Hearing shall be had before the council of all property owners who have filed written protests, and who will be subject to assessments for the proposed installation. Protest by those representing a major portion of frontage or district will postpone all further proceedings for at least six months. (However, under the "Improvement Act of 1911," three-fourths vote of the council may over-ride such opposition.)
- (4) Advertisement for contract bids.
- (5) Bids opened. If all rejected, the council must re-advertise. The "lowest responsible bidder" shall be accepted.
- (6) Notice of award of contract shall be posted and published ten days.
- (7) Property owners subject to assessment may, within ten days, undertake to do the proposed work on the same terms and conditions as awarded the lowest bidder.

- (8) Contract must be entered into within ten days, and work begun within fifteen, by contractor.
- (9) Assessment shall be apportioned and filed against property.
- (10) Council shall hear protests for inequitable assessments, Council's decision is final.

Class II

The "Municipal Improvement Act of 1915" and the "Municipal District Tax Act of 1919" are very similar, with the following distinction. The first provides a bond issue for installation only, whereas the latter provides for installation and operation for a period of one to five years, the officers of the municipality acting for the district. The tax under the Act of 1919 is limited to 35c. per annum for every \$100 of property valuation.

The general steps in the procedure under these acts follow:

- (1) Petition of 10 per cent of the qualified electors of the proposed district, specifying the proposed improvement and the boundaries of said district, is filed with the city council.
- (2) The city council may thereupon pass an ordinance, declaring its intention to call an election of said district for raising the necessary funds, stating the boundary of the district, the improvements, the date of election, and date for hearing protests.
- (3) Notice of said ordinance to be posted and published.
- (4) Hearing of protests to be had before council, whose decision is final. If any protest is sustained, further proceedings are postponed for six months.
- (5) The boundaries of said district may be modified by the council by publication and hearing of all protests, not less than ten days after the publication of the resolution to modify.
- (6) The election. The council shall divide the proposed district into one or more precincts for such election.
- (7) Special tax shall thereafter be levied against property in this district.
- (8) Contracts to be let.

Class III

The "Acquisition of Public Utilities Act of 1913" and the "Street Lighting Act of 1919" are very similar, with this distinction: the Act of 1913 provides for installation and operation for a two-year period, whereas it is doubtful if a street lighting installation can be made under Act of 1919, but it definitely provides for operation for five years for those systems already installed.

The general steps of procedure under these acts follow:

- (1) Resolution of intention passed by council.
 - (a) Specifying extent of district to be benefited and against which assessments shall be levied.
 - (b) Proposed improvement.
 - (c) Directing a report from a certain board, or officer of improvements, or engineer, to be designated by the council.
- (2) The report of said board or officer of improvements or engineer, which shall specify:
 - (a) Plans and specifications of proposed improvements.
 - (b) Estimate of cost.
 - (c) Diagram of assessment district.
 - (d) Proposed assessment against respective property, proportional to benefit.
- (3) Report considered by the council and any modifications made.
- (4) Notice of acceptance, or modifications, to be posted and published.
- (5) Hearing not later than twenty days thereafter of any protests by property owners within the district.
- (6) Assessments levied. Any contest of assessment to be made within thirty days thereafter, and appeal therefrom within thirty days more. The assessment is a lien upon the property, subject to sale for delinquent payments and redemption by owner.
- (7) Council may advance moneys from the general fund to expedite making of any such improvements, which advancement shall be refunded from assessments collected.
- (8) Contract let to lowest responsible bidder, after transfer of assessment role to tax collector.
- (9) Proceedings may be abandoned by the city prior to letting of the contract.

Where it is desirable to form a lighting district for installation and operation, it can be accomplished in two ways: First, install the system under one act and provide for its operation under another; or, second, provide for its installation and operation for one to five years under one act, at the expiration of which time the city council can re-establish the district under a different act which might be more convenient or desirable.

APPENDIX D

The "Highway Lighting District Act of 1909" is one statute clearly applicable for lighting districts in territory outside of incorporated cities. This act is limited in its operation strictly to towns and villages, and does not include farming districts. Just what constitutes a village is not known, but several stores and houses at a cross-roads would probably qualify. A post office at such a location would remove any doubt in the matter. With the advent of highway lighting units, some action should be taken to clarify this subject.

Under this act, the steps in the procedure follow:

- (1) Petition of 25 taxpayers and residents of said town or village presented at a regular meeting of County Board of Supervisors, specifying name and boundary of proposed district.
- (2) Board of Supervisors to fix date of hearing 25 to 30 days thereafter.
- (3) Notices by clerk to be posted at once in three public places and published for two weeks in a newspaper, concerning such petition and the date set for hearing thereon.
- (4) Persons objecting to formation of such a district may file written protests to the same.

- (5) Hearing of said protests, the Board's decision thereon being final.
 - (6) Resolution by Board of Supervisors within 30 days thereafter, providing for election within 30 days, and appointing three electors to conduct same.
 - (7) Three notices to be posted, and publication for 15 days, concerning proposed district, and date and places for election.
 - (8) Election on acceptance or rejection of said district.
 - (9) Resolution by Board of Supervisors establishing district (provided such vote carried).
 - (10) Board of Supervisors shall act for the lighting district, advertise for bids, let contract of installation, and provide for maintenance.
 - (11) Tax levy shall be estimated September 1 of each year, levied and collected against property within district like any other tax.
- (Provisions are also made for alteration, enlargement, or abandonment of district.)

Residence Lighting

By CLARK BAKER*

IN order to determine to any extent the present practice in residential lighting, a survey of 1,500 middle class homes was made. These homes were representative groups from a number of cities throughout the country. The survey reveals the influence of rental and of ownership, on the wiring and lighting equipment. It shows the average rented middle-class home consists of slightly under six rooms, and the average "owned" home slightly more than seven rooms. The rented home has less details in wiring, fixtures, portables, convenience-outlets, etc., than the owned home.

In order to put these data on a comparable basis a modern middle-class home was designed and adequately wired for lighting and convenience-outlets to bring out the degrees of saturation of various items of wiring and equipment in this class of home. All items except ceiling fixtures were less than 50 per cent of what they should be. The chief deficiency is found in the convenience-outlets per home, likewise outlets for brackets. The deficiency in lighting equipment is chiefly found in lack of shades, wall brackets and portables. It likewise was found the wattage per socket was low. From 12 to 38 per cent of the wall brackets found were without shades. From 7 to 21 per cent of the ceiling fixtures had no shades.

The survey may be summed up approximately as follows: One-half of the population live in places larger than 2500 inhabitants. About two-thirds of the homes within reach of electricity are wired. One-half of the homes are rented. The middle-class home is less than one-half lighted.

That portion of the survey which extended into low-class homes brought out that they were less than one-half as well lighted as the middle-class home.

Recommendations of Standards to be Worked To

The average home may be wired and equipped in various ways. The following, however, are general descriptions submitted for this committee's recommendations. No detailed description of fixtures, portables, or side brackets is presented. It is assumed these will be equipped with proper shades, however.

Living Room

General lighting from a shower, or from "direct-indirect" portables, could utilize 200 watts. A table-lamp, a floor-lamp, a small piano or desk lamp, and two small decorative portables can account for 340 watts. This is a total of 540 watts, all of which of course, would seldom be used at one time. If decorative brackets were used the general lighting or decorative portables might be reduced accordingly. Three convenience-outlets are specified.

Dining Room

In the case of a shower, lamps aggregating 150 to 200 watts in deep dense shades could provide general lighting, and from 30 to 100 watts in decorative portables or brackets. A total of 230 watts is assumed to be desirable. One convenience-outlet is specified.

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Kitchen

A 100 watt lamp in the central fixture is assumed to be a desirable average. This would be a 150 watt if a "daylight" lamp is used. Two auxiliary brackets or other sockets would easily account for 80 watts. It appears safe to assume a total of 180 watts as desirable. One convenience-outlet is specified.

Bedroom

A central fixture using 50 watts, two brackets or dresser lamps using 50 watts, and a bed lamp of 40 watts makes an aggregate of 140 watts. This wattage may easily be distributed in two brackets and a portable without considering a ceiling-fixture. One convenience-outlet is specified in each of three bedrooms.

Bathroom

One bracket on each side of the mirror and each containing a 50 watt lamp accounts for 100 watts. One convenience-outlet is specified.

Basement

Assuming a 100 watt lamp or a 150 watt "daylight" lamp over the laundry trays and four other outlets distributed in locker, over work-bench, near heater, in coal bin, in toilet, etc., it is easy to account for a total of 300 watts.

Convenience Outlets

A total of nine is assumed, thus providing an average of one per room with two extra for the living room.

Portables

A total of eight is assumed; these include the small decorative portables.

Wall-Brackets

A total of nine is assumed; these can easily be accounted for from a purely utilitarian standpoint without considering any decorative brackets in the living or dining-room. Two in each bedroom, two in the bathroom, and one in the kitchen account for nine.

Ceiling Fixtures

An average of one per room is quite, if not more than sufficient.

Total Wattage

A total of 1,770 watts in these various rooms is assumed.

Note that no mention is made here of hall-ways, porches, etc. Only the living-room, dining-room, kitchen, bedrooms, bathroom, and basement enter into the values presented.

Ways and Means

There should be in the hands of all sales organizations, power companies, jobbers, manufacturers, fixture manufacturers, contractors and dealers, educational material on the proper voltage of lamps. There should be brought to the attention of all sales organizations, power companies, jobbers, manufacturers, fixture manufacturers, contractors and dealers, the work of the Illuminating Glassware Guild, also the position of the fixture manufacturers in lighting design.

There should be worked out and promoted in all sales organizations, together with architects and builders, a revision of their present order of things when it comes to the lighting of the home. By that is meant, instead of starting at the entrance switch, carrying the wires throughout the home and finally end by putting only one outlet in a room, start with the kind of light and amount of light which will be required in each room consistent with the architectural design and color scheme, thereby fixing the number of outlets required in each room, then gather these up as they go along, finally working to the entrance switch. In this way, decorative fixtures, architectural design, subdued light (which doesn't materially mean less light) color effects, etc., can and will be encouraged with a greater degree of safety due to proper wiring. Three per cent of the cost of the house should be allowed for permanent lighting fixtures, an additional 3 per cent for wiring of lighting and convenience-outlet circuits.

The Improvement of Industrial Lighting

By G. E. ARBOGAST*

LEADERS in the electrical industry, particularly those interested in higher standards of illumination, realize the urgent need of coordinating the efforts of all branches of the industry in the inauguration of a campaign to sell the idea of better and more efficient lighting in our industrial plants. Toward that end this paper is written and it is divided into the following subjects:—Present Practices; Suitable Standards; Ways and Means of Selling this Standard.

The distinct trend (during the last ten years) toward higher intensities in the lighting of areas indicates clearly that the benefits of proper lighting are gradually becoming recognized. The average progressive operator no longer considers illumination as a necessary evil but views it in its true light as a vital necessity and as something that represents not an unavoidable expense, but an investment which will effect a minimization of accidents, increased productive capacity and economies in manufacture. There still remains, however, marked room for improvement both in the increasing of intensities and modernizing of equipment, as pace has not been kept with the rapidly rising standards and improvements in equipment.

Much has been said in the past regarding the production increases made possible through the elevation of lighting standards. For example, in many areas of the steel mill and foundry, production increases under good lighting, as compared to poor lighting, are made possible through the facilitation of the movements of the workers, increase in speed and accuracy of visual perception, better supervision in and about plants, and reduction in spoilage. With other factors remaining unchanged, an efficient system of lighting renders continuous operation practicable throughout the twenty-four hours, thus doubling the working time and conse-

quently the output. Furthermore, the cost per unit output is greatly reduced since fixed charges are distributed over twice the tonnage.

Present Practices

Lack of information on the part of factory executives about lighting and its importance to a properly conducted plant, perhaps more than anything else, is responsible for the 70 per cent or more of our industrial plants that are inadequately lighted. Unfortunately, this applies not only to the existing plants, but also to new ones being constructed every day. Bare lamps on drop cords are commonly used, with their attendant abuses, blinding glare and severe contrasts. Bare lamps on wide centers mounted directly on ceiling outlet-box receptacles are frequently relied upon to provide the illumination on the working planes.

These practices are natural tendencies on the part of the uninformed, for the first cost is obviously less. Sooner or later, however, the fallacy of skimping will become apparent to the management, but often too late. The wiring is in, but the capacity for increasing the lamp wattage to bring the system up to a proper standard is not there, and there is a common stumbling block to the application of a remedy to an old installation. A big step towards the elimination of this has been the establishment in some localities of ordinances requiring the provision for a certain "watts per sq. ft." wiring capacity—a rule which safeguards to some extent the factory management, especially of a lessee of factory space, against the embarrassment of large future expenditures in revamping the wiring to provide for the necessary added wattage.

Considerable improvement in lighting installations in industrial plants is noticeable covering a three-year period. It is safe to say that 50 per cent of new installations are designed to use modern equipment but sufficiently high intensities are neither recommended nor

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installed. The other 50 per cent are considerably below any standard, in many cases even below the minimum of the state law. Many industrial plants using loft buildings are particularly under-lighted. A much more extensive use of the RLM dome reflector is noticed but still there are many installations where the flat-type reflector is used. A not uncommon mistake in illumination design is in the installation of larger and fewer units instead of smaller and more units.

There are still found many installations installed three years ago and before, that are now obsolete, and a large percentage of these installations is still using bare lamps. There are approximately 15,000 manufacturing plants in California, and 50 per cent of these are of sufficient size to warrant an adequate illumination design. It is found, however, that about 55 or 60 per cent of those who should have adequate lighting are still badly in need of it. It is likewise found that approximately 50 per cent of these plants are either only partially equipped with reflectors or are without reflectors at all.

Among the smaller manufacturing concerns—that is, concerns employing from 25 to 50 or 75 men—it is estimated that about 35 or 40 per cent of the plant owners are unfamiliar or vaguely familiar with illumination and its value as to increased production, decreased spoilage and prevention of accidents. In the larger manufacturing plants it is found that approximately 80 per cent of the plant owners are familiar with illumination and its value. This brings out clearly the need of more intensive selling because of the fact that while 80 per cent of the larger plant owners are familiar with the value of good illumination, still from 55 to 60 per cent need better illumination. In other words, they know its value but have not been sold.

Suitable Standards

Though there are three or more distinct types of reflectors used for industrial lighting, the most common and that accepted as the most satisfactory for all general purposes is the RLM standard dome reflector. This together with a bowl enameled Mazda "C" lamp properly chosen as to size and correctly installed as to spacing and mounting height will, in general, give all that might be desired for a first-class industrial lighting installation.

High intensity general lighting, except in isolated cases, should be used rather than localized lighting; and, where localized lighting is necessary, its use should be merely supplementary to that of the general system. This last is important in that the contrasts in illumination resulting from the use of local lighting will usually be found so harsh as to be objectionable even though the lamps themselves are well shielded.

The lighting intensities recommended by various authorities agree in the main. It is interesting, however, to note the tendency during the past few years towards higher levels, a tendency which still persists. It is our opinion that in making a recommendation on intensities it might be well to set a definite value rather than to state a range as, for instance, 6 to 12 foot-candles which, it is felt, gives too much latitude to the judgment of the individual.

It is the desire of the committee to follow as nearly as possible the work that has already been done by the industry and no data have been compiled that more fully fit the condition than that covered in engineering bulletins issued by the leading lamp manufacturers. The following is quoted from one of these:

"Factory interiors are usually divided by columns into bays, or rectangles, of uniform size, and such bays afford a convenient starting point in determining the location of the lighting units. It is desirable that the lighting units be symmetrically spaced throughout the whole of an interior and this will result if the units are properly spaced in each bay. Furthermore, a correct lighting design presented in terms of individual bays can be readily extended throughout a plant of only a few or of many bays.

"Many times in interiors where there are no columns, the arrangement of beams on the ceiling, or trusses, will suggest a natural division into bays, which can be used in comparing the actual interior with the ready-made designs. Attention is called to the fact that large bays can frequently be split up into a number of smaller bays corresponding in size to some one of the common sizes. Furthermore, where there are no structural features suggesting bays of suitable sizes, any of the specifications in which the ceiling height corresponds with that of the factory under consideration may be duplicated.

"The more experienced the illuminating engineer, the less he feels inclined to give general figures as to how much light any factory operation requires, for he realizes that much depends upon individual conditions. He has no hesitancy, however, in stating that

more light than is generally used today may be used economically and profitably. Recent years have seen a large number of factory managers make a careful scrutiny of the facts regarding lighting and then put in four, five or six times as much light as they had previously considered an adequate amount.

"Daylight outdoors, in the shade on a sunny day, will measure about 500 foot-candles; the usual run of factory interiors will measure under artificial light in the neighborhood of 2 or 3 foot-candles. Obviously, in a well designed artificial lighting system there is little likelihood of there being such a thing as too much light.

"There are four general levels of illumination which the designer of a lighting system will do well to keep in mind:

"5 foot-candles.—Satisfactory for work of a coarse nature, such as rough assembling, rough packing, coal and ash handling, and the like, where the eyes are not called upon to see small details quickly and accurately. This value also would represent an abundance of light for warehouses, stockrooms, and aisles and passageways which were always kept free from obstructions. Enough light to dispel any sense of gloom.

"10 foot-candles.—Considered good lighting for most kinds of work on light-colored surfaces, and for fairly close work on dark surfaces. Not enough light for examining fine details on dark, light-absorbing surfaces.

"15 foot-candles.—Really excellent lighting. In addition to permitting quick and accurate execution of all work except the most exacting, lighting of this kind stimulates the workman and makes for fast and accurate production.

"50-100 foot-candles.—The upper range of artificial lighting values as judged by present experience. Necessary only in extremely fine, accurate operation and in inspections of very fine details.

"The arrangement of lighting units as described herein represents lighting practice which is up-to-date in every respect. All the important factors, such as light from several directions reaching the work at all points, uniformity of lighting, shadow, and freedom from direct glare have been given due consideration. In estimating the foot-candle illumination, average conditions have been assumed. Foot-candle values for small and large interiors are given, for the size of the room has a material effect upon the illumination obtained. In the usual types of factory interior, the reflecting condition of the ceiling and walls has relatively little effect on the actual foot-candles at the work where RLM reflector units are used. This does not mean, however, that it is not necessary to keep the walls and ceiling light and clean, for upon their ability to reflect light back into the room depends largely the bright and cheerful appearance of the interior.

"In the foot-candle and wattage values given, allowance has been made for average normal depreciation in service. It is important that the cleaning of equipment be put upon a systematic basis in order that the illumination may be maintained at a level which will insure economical production. Frequently, some type of disconnecting hanger which permits the units to be lowered to the floor can be used to good advantage."

From this rather long extract it is easily observed that these bulletins have covered the subject in detail. The committee would, however, make two supplementary suggestions or recommendations.

First. In laying out a lighting system for industrial houses in buildings where the wiring is concealed, such as loft buildings, or where the wiring can not easily be changed or additions made thereto, we recommend that provision be made for a minimum intensity of 15 foot-candles, even though the present tenant may use but a part of such capacity. It is our belief that lack of capacity in the wiring prevents the use of the higher intensities, and the cost of changing concealed or inaccessible wiring is often almost prohibitive.

Second. It is recommended that tables be provided converting foot-candle intensity to watts per sq. ft. for various mounting heights and spacing of lighting units. This table would be approximate only, but would enable the contractor to quickly determine whether the system he was installing was of suitable capacity, which he might not be able to determine if he had to use foot-candle terms. A rough specification illustrating this point follows:

SPECIFICATIONS

Bays, 20 ft. x 20 ft.	Mounting height, 10 ft.
Ceiling height, 12 ft.	Equipment:
Units per bay, 4.	RLM standard dome reflectors with
Spacing, 10 ft. x 10 ft.	bowl enamel Mazda lamps.
	Wattage per outlet 100 foot-candles, 5
	Wattage per outlet 200 foot-candles, 10
	Wattage per outlet 300 foot-candles, 15

Ways and Means of Selling Suitable Standards

As pointed out above, the great lack of adequate lighting in factories is largely due to the need for information. It is quite apparent, therefore, that one of the outstanding means of selling a proper standard is through education, not alone of the industrial management, but of the man who attempts to sell it as well. In other words, it is necessary that the one who undertakes to sell the factory manager proper lighting know his line. Unfortunately, too often either in his eager-

ness to sell his product or through his ignorance of the essentials of good lighting practice, he leaves the customer but little better off than before.

The steps in the conception, design, and construction of an industrial plant, however, are several, and selling the lighting standard can generally not be left until a time when the owner is ready to talk and consider the purchase of the equipment. There is first the architect or engineer who plans the building and writes the specifications. The education should properly begin here. Next, the electrical contractor who installs the job needs to know the importance of adequate industrial illumination, and to know the essentials for planning a proper system to meet the responsibilities which the architect may have failed to meet. Next comes the supply man or jobbers' salesman, who in his daily contact with the electrical contractor, has the opportunity to guide him where such contractors can not measure up to the task of carrying the necessary information to the owner. In other words, the education must start within the industry itself, and with the established standards of equipment and simple rules of application, this education lies within easy reach of any one who wishes to give the subject a small study.

One of the actual ways and means of selling a proper standard, assuming that the industry is equipped with a knowledge of the subject, is actual demonstration. Especially is this effective on old jobs where entry has been effected. The use of samples installed free in a bay in such a manner that there is a marked contrast between the old job and a proper one, generally results in the sale of the sample installation with an order for similar equipment for the remaining space.

The use of photographs of actual installations is most effective in picturing to the owner what his plant would look like under proper lighting conditions. He very frequently asks if there is a good installation in the city or near at hand that he might look at. A list of such installations to which he might be referred, therefore, lends itself well. As the specialist becomes active in his work, he will have local experiences with the advantages of good illumination and will be able to use them most effectively in talking with his prospects.

The man who hopes to sell lighting to plant executives must be able to talk forcefully and authoritatively on its proved advantages and the money value of good light in the larger return in both quantity and quality of work which will result from the installation of a superior as compared with an inferior lighting system. Data and information to this end will be found in the Proceedings of the National Electric Light Association, the Transactions of the Illuminating Engineering Society, and elsewhere.

The importance of enlisting the cooperation of all electrical interests in the community can scarcely be over emphasized. All classes of material and equipment, as well as labor are involved in a greater or less degree in the installation of a new system or the remodeling of an old one.

The central station, by virtue of its constant connection with the industries, is the largest factor in the lighting situation and should take the leadership in selling the idea to the other organizations. Speakers on lighting should be provided to talk before various executives' groups, contractors' meetings, as well as architects' and designers' gatherings. Intensive campaigns conducted jointly by central stations, manufacturers, jobbers, and contractors have great possibilities, both in popularizing the need for better illumination and in the actual selling of installations.

More publicity should be given the State Lighting Code. Though the minimum intensities required under this Code are decidedly inadequate, recommended values are also given which are more nearly desirable. The fact, alone, that proper lighting is important enough from just the standpoint of the health and safety of employees to warrant state legislation, commends attention.

Educating the Industry

Too often papers on subjects like this deal in generalities and do not make definite recommendations. This committee has gone further and suggests that schools be established in at least three localities; namely, Northern California, Southern California, and the San Joaquin Valley, in which a course on illumination design would be given. This course should cover the basic and

fundamental facts of illumination by easy, simple, calculating methods, so that the student will have a training which will permit him to lay out a practical installation for either commercial or industrial lighting, that will take care of at least 80 to 85 per cent of the cases. This course could be concentrated and given in a week or spread over several weeks as decided upon by those interested in each locality.

In these schools there should be as many men from their sales organizations as the central stations can allot. There should be at least one man from each jobbing and manufacturing organization, and as many more as may be arranged. The contractors should send as many of their men as come in contact with illumination problems. It may be thought wise to have the architects' offices and consulting engineers represented.

The curriculum is already established, as such schools have been conducted elsewhere. A suggested list of subjects follows:

Demonstration of lighting fundamentals; simplified methods of designing illumination; the use of educational publicity; engineering bulletins; trade paper articles, etc.; economic interpretation of lamp tests; development of improved lighting equipment; illuminating engineering recommendations of industrial plants, offices, stores, public buildings, streets; special lighting designs; candle power standards; foot candle meters and intensities; special industrial lighting requirements; lighting economy; special lighting problems (examples); preparation of plans and specifications for lighting; principles of light reflection and diffusion; choice of lighting equipment; lectures and demonstrations on residence lighting; possibilities of light and color; street lighting; suitable standards for street lighting; selection of equipment for street lighting; intensities for residential section and business section; store lighting; show window lighting; commercial and public interiors; requirements of school lighting; lighting practice and the illuminating engineering society; design of illumination for offices and drafting rooms; practical design of general lighting for industrial operation; Mazda quality; a lighting salesman's responsibility; manufacturing service by the lamp and reflector manufacturers.

The establishment of these schools in the fall, preferably in October, has already been anticipated and a budget has been submitted to the executive committee of the Pacific Coast Electrical Association for funds necessary to operate such schools.

It is believed that the Lighting Bureau should be charged with the responsibility of establishing these schools and are satisfied that there are enough interested men in the industry to conduct them, who know the subject thoroughly and are willing to give their services for this work.

Annual Lighting Months

In order that both the industry and the public may receive the greatest benefit from the educational work done in the schools, we recommend that November of each year be set aside as Lighting Month.

During that month an intensive campaign should be prosecuted to get the idea of the need for more and better light before the public, particularly commercial and industrial establishments. To accomplish this the industry should maintain a speakers' bureau and make every effort to be represented on the programs of such clubs as Rotary, Kiwanis, Soroptimist, etc., where the story should be told with suitable visual displays. All branches of the industry should cooperate in every way possible in order to secure effective results. All local advertising should be tied in with this campaign, and if possible cooperative page advertising should be used to secure from the press desired publicity in their news columns.

The committee believes that the Lighting Bureau should be charged with the responsibility of conducting this campaign.

Recommended Standards for Commercial Lighting

By H. H. COURTRIGHT*

THE objective set for itself by the Commercial Lighting Committee this year specified three definite accomplishments. As all work and discussions were carried on with these three points in view the results of the committee's efforts can best be laid down under these respective headings:—

*Sub-Committee on Commercial Lighting: H. H. Courtright, chairman; S. H. Anderson, H. H. Allison, G. H. P. Dellman, Leonard Hobbs, Fred S. Mills, David Pence, Frank Smith, A. L. Spring.

1. The determination of present practices and existing conditions in commercial illumination on the Pacific Coast.

2. The recommendation of standards of intensity toward the establishment of which the entire industry shall be urged to work for the general welfare of all.

3. The recommendation of certain specific means whereby the above standards and the value of adhering to them, may most effectively be spread broadcast to all interested parties.

Present Practices.

The following figures, obtained in a recently made coast-wide survey of retail stores are exemplary of conditions as they exist today:

10 per cent had an average interior intensity of 10 foot-candles or better.

28 per cent had an average interior intensity of 5 to 10 foot-candles.

62 per cent had an average interior intensity of less than 5 foot-candles.

Approximately 60 per cent of the installations were direct lighting; 25 per cent semi-indirect (totally enclosed glass units); and 15 per cent had bare lamps.

5 per cent had a show window intensity of 40 foot-candles or better.

10 per cent had a show window intensity of 15-25 foot-candles.

20 per cent had a show window intensity of 10-15 foot-candles.

65 per cent had a show window intensity of 5 foot-candles or less.

The 15 per cent of the two upper classifications were using color, spotlighting and floodlighting. Of the 65 per cent with a show window intensity of less than 5 foot-candles at least 35 per cent were using bare lamps, the remaining 30 per cent using direct or semi-indirect ceiling units.

This survey included stores in which there was an employer and two or more clerks. Regarding the show window intensities above stated, these do not refer to the actual intensity maintained in the window but to the fact that the windows were wired and equipped to attain those intensities; it being practically impossible to determine the average intensity maintained in a window over a given period due to burnouts, lamp removals and dirty equipment.

The true significance of these figures and the vast market which they reveal can best be indicated by quoting from another survey, as follows: Of one thousand stores investigated 991 were in need of better interior illumination and 882 better window lighting. It was further brought to light that of these merchants whose stores were poorly lighted 90 per cent were desirous of securing better illumination as soon as the defects of their present systems had been clearly pointed out. The estimates of the lighting men making this survey as to the cost of bringing the various installations up to a desirable standard show a potential business to the manufacturers, jobbers and contractors of \$125,000 in the 1,000 stores surveyed. This survey was conducted in one city alone; conservatively estimating that there are 25,000 stores on the Pacific Coast similarly in need of such improvements in illumination, a market of three and a quarter million dollars is thus opened up. This has to do exclusively with the bringing of old stores up to desirable standards and does not take into consideration the constant market maintained by newly constructed stores.

Recommended Standards.

When we find stores and office buildings which are obliged to change their lighting equipment within a year or so after construction—and in some instances actually before the tenants have all moved in—it is due time for concerted action, on the part of those interested in the welfare of the lighting industry, toward the correction of such conditions. Unfortunately there are today cases where such conditions obtain.

In determining upon the standards which it shall recommend the committee concluded to base these standards upon wattage per outlet necessary to provide the desired intensity and to specify an ample capacity to take care of such increased intensity as the natural progress of illumination may call for during a reasonable period of time. Two reasons governed this decision: First, there is seldom any means of determining at the time of construction what type of store will occupy a building; second, there is no means of controlling, other than by a long educational process, the tendency to reduce the size of lamps occupying the sockets, in an effort to reduce power bills.

By providing adequate capacity at each outlet for the maximum intensity desired, any occupant, regardless of the type of establishment, can have good illumination; and if the wiring is in to take care of increases it is far easier to sell better illumination than if such improvements entail re-wiring.

The recommendations of this committee are, therefore, that store interiors, office and loft buildings shall be wired for three watts per square foot to provide a general illumination of approximately 15 foot-candles. This standard is set as a desirable average toward the maintaining of which the entire industry is earnestly requested to lend its support. Show windows shall be so wired that there shall be adequate capacity to provide for 150-watt outlets on 12-inch centers, together with 200-watt outlets on 10-foot centers for special lighting. These outlets to be in addition to, and on a separate circuit from, convenience outlets for use of art lamps and movable electrical displays.

Means of Broadcasting Standards

The lighting salesman working in the commercial field has two important factors with which he must contend—the owner of the building and the contractor doing the wiring. To the first he must sell the idea of increased lessee-satisfaction and elimination of expensive re-wiring in a few years as illumination standards progress. The second must be imbued with the idea of the increased remuneration resulting from higher standards of work, and the increased good will resulting from such an installation. With the one it is a question of salesmanship—with the other education.

The following means are those which this committee believes can be most effectively employed to properly spread the story of better commercial illumination, toward the end that the great market previously pointed to may be invaded and capitalized upon:

Inasmuch as the terms "poor lighting," "good lighting," and "excellent lighting" as used in many of the present tables of recommended standards have a tendency to cause the average store-owners to be satisfied with a "good" intensity rather than striving to attain the benefits of an excellent job the Lighting Bureau should recommend to manufacturers and others publishing standards that they change their recommendations to specify a capacity per outlet necessary to give the highest intensity which they recommend for each type of store.

The recommended standards of all lighting committees, (residence, industrial and commercial) should be prepared in a printed form for distribution to architects and builders by the representatives of the California Electrical Cooperative Campaign; and should be printed in the Pacific Coast Data and Sales Book, the recognized source of information of electrical contractors.

A most rapid and impressive means of calling the attention of the merchant to the advertising value and sales effect of good illumination would be for the power companies to equip the windows of their offices for a high intensity of white lighting and for colored lighting, spot lighting and flood lighting. These windows could then be offered to local dealers for display purposes, the dealer arranging the window trim of his products and the power company lighting it to secure the most appealing effects. Sales would undoubtedly result for the dealer and he would readily appreciate that if proper illumination could sell his merchandise when it was displayed in the company window, proper illumination in his own windows could most certainly increase his sales. Interest could be developed to a considerable extent in such an effort by advising the local Chamber of Commerce of the plans and pointing out their effectiveness in keeping purchases in the home town and increasing the local merchants' business. In connection with such a program a contest might be inaugurated, a prize being offered to the merchant who trimmed the power company window with the display which was voted by the local townspeople to be the most attractive. In the interest of local development the newspapers would undoubtedly give extensive publicity to such a contest and even carry in their columns the ballots for voting. This plan would, of course, be most effective in the smaller communities.

In closing, this committee goes on record as opposing and condemning sharp practices, unethical methods, and misrepresentations in the sale of lighting equipment; and as recommending the use of standard units of recognized quality only for all installations.

Advertising Value of Electric Signs and Billboards

By TRACY SIMPSON*

THE electric sign as a dignified and valuable medium of advertising is becoming fully recognized.

Its popularity and increased use by large national advertisers, including many of the important industries, augurs well for continued and ever increasing business in this important field. Electric signs and illuminated night displays are a mark of progressiveness, and streets well provided with them always indicate commercial activity and life. To the merchant and business man on the street, it acts as a spur and stimulus to the further use of electricity, especially in the form of higher standards of illumination in both store windows and building interiors.

Very few people are aware of the effectiveness of the electric sign as an advertising medium. Some idea of its economy may be gained by glancing at the following comparison of the best known methods.

Adv. Medium	NUMBER PERSONS REACHED				Average Cost
	Small Town	Medium City	Large City		
Electric Sign.....	1,000 per day	15,000 per day	300,000 per day	\$ 2.00* per day	
Newspaper.....	1,200 per day	25,000 per day	150,000 per day	\$11.00 per day	
Painted billboard.....	500 per day	5,000 per day	250,000 per day	\$16.50 per day	
Street cars.....		15,000 per day	500,000 per day	\$33.00 per day	

*Cost of Investment in Sign prorated with operation costs.

It will be noted that while street railways exceed in the number of people reached the cost to the average merchant is prohibitive. Also, the papers, billboards and street car cards are in force only for the month or until expiration of the contract, while the electric sign continues to give its message year after year at a nominal upkeep cost.

Visibility.

There are many types of electric signs in use today which may be classified, as follows:

- (1) Channel or display
- (2) Embossed letter
- (3) Panel
- (4) Attraction or interchangeable
- (5) Flashing or action
- (6) Opal glass letter (drum type)
- (7) Illuminated billboard
- (8) Indoor and immature

All of these signs are devised to illuminate letters, trade marks or other reading matter so that it will be visible at the greatest distance both day and night. To do this successfully there are certain principles of optics that must be considered, but which are often overlooked.

It has been scientifically determined that the eye can distinguish separate objects if they are so spaced that the angle between them at the point of vision is greater than 1 min. (1/60 deg.). Therefore all parts of the letters and words must be separated by a distance which subtends an angle of at least 1 min. at the distance at which people will read the sign. Otherwise the words and letters will appear run together and blurred. This is only the absolute minimum, however, and it has been found that the distance between members should be from 60 to 75 per cent of the letter height for good results.

The following table gives basic proportions:

Height In.	Length In.	Width In.	Space In.
12	9	3	4
24	18	4	5½
30	22½	5	7
36	27	5½	9
42	31½	6	11
48	36	8	12
60	45	10	15
72	54	11	18
84	63	13	20
96	72	15	21
108	81	18	24
120	90	20	27
144	108	24	30

The proportions of the letters themselves affect the readability of the sign and it has been found that the

letters should have a length (horizontal distance) equal to two-thirds or three-quarters of the height (vertical distance).

Thus it is readily seen that the height of the letter has considerable bearing on its readability because in the letters the integral parts are farther apart and thus easier to read at great distance.

The stroke width also has considerable bearing on the sign because of the seemingly contradictory day and night effect. In daylight the wider the stroke the greater the distance of readability, while at night the narrowest stroke gives the greatest readability. Thus it must be determined whether the sign is to have greatest day or night value to determine the stroke width. For general conditions, however, the stroke should be from 20 to 25 per cent of the height. It may be desirable to combine great stroke width in daytime with nar-

row illuminated stroke at night and thus secure greatest visibility of both day and night.

It is often necessary to depart from theoretical dimensions, however, to give proper appearance to the sign. The designer of illuminated signs must consider all conditions under which the sign is to be used and then decide on the dimensions best suited to the particular case at hand. There is a tendency to follow the path of least resistance and utilize signs of any variety just because it has been done elsewhere, but this practice should be discouraged by the entire industry.

Illuminated Signs and Billboards

One phase of sign lighting which has been developed to a large extent in California is the illuminated billboard. On account of the favorable weather conditions and the many miles of highways close to power lines, illuminated billboards and painted signs have found almost unlimited use.

Though a large percentage of the billboards in the hands of bulletin advertising companies today is illuminated, there are thousands upon thousands of painted signs of all sizes and descriptions, which could be effectively lighted. Many of these signs, painted and repainted at considerable expense, are positively dead at night and their effectiveness questionable by day because of the distraction of daylight activity and confusion. No end of these, therefore, stand ready to be lighted and await only the submission of a plan to the owner by a competent solicitor.

As against the electric sign, the illuminated painted sign offers greater possibility for detail, and the ability to change the design at small expense adds greatly to its advertising flexibility. Since the effectiveness and attractive power of an illuminated bulletin board or sign are largely dependent upon the contrast in intensity with the surroundings, it follows that signs located in brightly lighted downtown districts must be lighted to higher intensities than those in outlying districts. By the same token, the equipment used to direct this illumination on the sign must confine the light to the sign itself, avoiding as much as possible undue spill on surroundings.

Though some lighting of large painted signs has been done by projectors mounted on adjacent buildings, the best results are obtained by the use of specially built, porcelain enameled, steel, angle reflectors mounted well out in front and above the board. Reflected glare from the board and non-uniformity of illumination are common abuses and should be guarded against in the choice and installation of reflector equipment. Angle reflectors, of a design which permits of mounting well above the board, tend to eliminate this objectionable glare or spotty effect and, at the same time, allow a full and unobstructed view of the face of the board

*Sub-Committee on Sign Lighting: Tracy Simpson, chairman; Paul D. House, vice-chairman; H. K. Griffin, H. H. Allison, S. H. Anderson.

or sign. Though the levels of illumination for billboards and painted signs, like that in other fields, are gradually rising, a value no less than 10 ft.-candles on the vertical surface of the sign might be given as good practice in the more brightly lighted districts. Specifications are readily available covering the illumination of various heights of boards.

The following table, however, gives the proper mountings for standard size boards:

Mounting Dimensions of Lighting Units

Height of Board in Ft.	Spacing in Ft.	Distance Out in Ft.	Distance Above in Ft.	Size of Lamp	Ave. Ill. Foot-Candles
2-4	5	3	1	75 watts	9
5-6	6	4	1	100 watts	9
7-8	6'6"	4'6"	1	150 watts	9
9-12	8'0"	5'6"	1	200 watts	10
13-16	10'0"	6'6"	1	300 watts	11
17-21	13'0"	9'	2	500 watts	10
22-25	17	12'	2	750 watts	11
26-30	20	15	2	1000 watts	10

The increased speed of vision obtained through use of higher intensities—a fact brought out in the increased production in factories where better lighting is provided—may well be applied to illuminated billboards and painted signs. The importance of this fact is at once evident when it is considered that the largest percentage of individual observations of these illuminated displays are now made from rapidly passing automobiles and not by pedestrians. It is essential, therefore, that the printed or painted matter be visible at the maximum possible distance to the approaching motorist.

Manufacturers

It would seem that a standardization of ordinances would do considerable toward aiding the sign manufacturer on the Coast, as there is a multitude of sign laws which differ radically for different cities. These ordinances vary from a 12 in. projection allowed at Long Beach, Calif., on vertical signs, to the 4 ft. vertical projection allowed in most other cities, with 18 in., 24, 30, 36 and 42 in. projections sandwiched in between.

Although the Eastern cities are not all standardized the great majority allow vertical projection of 4 ft. and the horizontal projection to the curb, but there has developed on the Pacific Coast a custom requiring all such signs to be swung back against the building during the daylight hours which has retarded development to a certain extent. If the horizontal projection in the various cities could be standardized at 4 ft. a very satisfactory condition to manufacturer, dealer and central station would be attained.

The manufacture of electrical signs can be put on a satisfactory basis only when all manufacturers carry on their product the label of the National Board of Fire Underwriters. Local city ordinances everywhere should recognize this label as covering factory inspection and the manufacture of electrical signs.

Review of the rules of the National Board of Fire Underwriters shows that they are not only reasonable but fairly liberal and any manufacturer who cannot comply with them is certainly not putting out a creditable product. The Board's service on the Pacific Coast has been improved in the past year and the securing of labels and inspection from the Board's representatives works very little inconvenience to the manufacturer.

Lamps

The size, type and kind of lamps for various signs is a subject too large for a complete discussion here but a few important points should be noted.

In the matter of selecting lamps for signs, as in the design of letters, a number of variable factors must be considered. A huge roof sign high up on a skyscraper must have such brilliance that the sign stands out in contrast to the background. The advertiser desires to bring to the attention of the passerby a certain article with such brilliance that the idea is impressed on his mind. Such a sign must have no subdued light as is obtained by lamps equipped with some form of diffusing medium, like frosting or enameling, but rather should have a glittering brilliance, almost a glare, as obtained from a clear lamp.

While within working limits the readability of a sign decreases as the brilliance of the lamp increases, it should be remembered that signs attract by their brilliancy and the advertising value in many cases would not be lessened to improve readability.

For huge roof signs this factor may be neglected as at all times the distance between the sign and the observer is such that the brilliance is not objectionable. In present practice, the signs in large cities are of such high brilliance that additional ones, unless they are at least of equal brilliancy with the surrounding signs, will not attract attention and their value as advertising mediums is lost. However, the smaller signs on the front of buildings and hanging close to the street must

necessarily be of a much lower order of brilliancy; otherwise the observer will be blinded by the flood of light and the sign will be illegible, thus defeating its purpose. If, because of high general illumination, it is necessary to have the small, low hanging sign illuminated to a high intensity, some form of diffusing medium must be employed on the lamps in order to prevent the blinding of the observer by the high intrinsic brilliancy of the lamp filament. By using frosted lamps the appearance of signs hanging close to the street is greatly improved, especially to observers at a short distance from them, although the readability at a distance is not greatly changed.

For the small signs with which a trough letter would be used the problem is different. Here the sign is much closer to the observer, and high wattage lamps in clear bulbs would blind a person to such an extent that they would be objectionable. A more diffused or softened light is desirable and low wattage lamps which have been either enameled or dipped in various colors improve the appearance of the sign and attract the eye of the observer by the unique color combination of light.

The most effective means of advertising is the electric sign properly designed and lighted. Yet how many sign owners realize this effectiveness after they have installed one? Burnt out lamps are not replaced for days and sometimes weeks at a time. Also, they are allowed to become weatherbeaten and faded, when at a small cost they can be taken down and renovated.

An electric sign to function properly as a publicity medium should be the outstanding center of brightness in that locality and clearly readable at a good distance. This is proved by the theatres that keep their signs and marqueses serviced by some reputable sign manufacturer, who for a small cost will undertake the upkeep and maintenance, that is, keep flashers running properly and replace burnt out lamps. One has but to walk down any main street and make the comparison of sign lighting of theatres and that of other business places to be convinced of the volume of business not receiving proper care. The prospective lamp renewal alone runs into a surprising figure. With the tendency to use lamps of larger wattage and more colored effects this potential business will be greatly increased.

Upon the sale of a sign the purchaser should be sold the idea that outside of an advertising medium a sign should be an attractive decoration for the exterior of his building, and as the operating expense is so low in comparison with the advertising value that he could well afford to have his sign maintained at a small cost. This, the manufacturer could do at a profit by getting volume enough, and the practice would tend to keep him in touch with the purchaser.

Ways and Means of Promoting Sign Sales

Probably the greatest hindrance to sign sales today is the objection on the part of building owners to having unsightly signs on the premises. While in some instances this attitude is justified, the sign industry may readily overcome this by cooperation with those who design the building.

Architects in many instances have become aware of the necessity of the electric sign and are including a sketch of the sign in their building plans, in the same way that they now include the marquee in the design

of motion picture theatres. This is having a tendency to promote sign-lighting by reason of its being drawn into the architectural design of the building.

Signs are constantly becoming more and more elaborate and the old unsightly type of former years has given way to works of art. Individuality in his electric sign is as important to the owner as is individuality in his business and in his other forms of advertising. Especially is it necessary where there are other signs in close proximity. Any marked similarity tends to detract and lessens the effectiveness of all. Distinction in design, color and flashing schemes is highly essential in order to retain full value in attractive power. The particular needs of the customer, therefore, should be carefully considered in the planning of his sign.

Large signs, if properly designed, do not appear to be heavy or bulky. More often, they add to the attractiveness if they are properly designed. The bulky, unfinished appearance of small signs can be largely overcome by a more careful use of ornamentation. Also there is a great demand for a more flexible construction of large signs to permit a change of display. In many districts where the same people pass a sign day after day and week after week much of its effectiveness is lost just because it becomes a part of the familiar skyline. This feature is being recognized by the advertiser who uses the electrical sign medium.

Background, brightness, and border lighting are phases of sign-lighting which are being studied by designers and architects because of their importance. Color, motion, etc. likewise are very important elements and are receiving the attention of the electrical advertiser.

A great many opportunities for sign installations may be gained through intimate cooperation with the

power company representatives who are constantly in touch with new consumers. During 1923 one Western power company carried out a cooperative sign campaign with the manufacturer resulting in the sale of 780 signs and adding over \$25,000 yearly revenue to the lines. This shows what may be accomplished by cooperation within the industry.

Briefly, the outstanding items for increasing sign sales may be summed up as follows:

- 1—Standardization of ordinances.
- 2—Proper maintenance and upkeep service.
- 3—Architectural designs for buildings.
- 4—Use of colored and changeable signs.
- 5—Cooperation with power companies.

Conclusion and Recommendations

The sign committee has realized from the scope of its investigations this year that the greatest work is yet to be done by the sign committees of the Pacific Coast Electrical Association. This committee has not found it possible to go into the matter of laws governing visibility of signs and yet is so fully aware of the need of investigating this phase of the subject that it wishes to urge following sign committees to take up the matter. No greater task could be performed for the sign industry on the Pacific Coast than that of making a close study of sign design and tabulating the effects of spacings, colors and brightness.

Although some very valuable information is already in existence on that subject it is not presented to the industry in a complete and simple form. This committee, therefore, strongly urges the sign committee of 1924 to investigate and make a complete report of laws governing visibility of electric signs.

Activities of the Consumers' Service Bureau

By A. M. FROST*

THERE has developed a strong realization, by the men engaged in the commercial departments of the electrical industry, and particularly the central station industry, that the foundation of business development must be laid with a proper appreciation of the obligation the industry owes to its customers and consumers.

The basis of all sales and general business promotion, is, first of all, satisfied consumers. The value of a satisfied consumer as a salesman is not to be overestimated. There has been much good work done by the different central station companies to promote a better understanding between the consumers and the utility companies, and it is desired by the members of the Pacific Coast Electrical Association, that these different company executives, in the commercial departments, be able to avail themselves of the experience and knowledge that has been individually developed.

With the above general ideas in mind, it was decided at the organization meeting of the Commercial Committee, held in Los Angeles on Aug. 10, 1923, to organize the Consumers Service Bureau and a committee was appointed to carry on the work of the committee.

Considerable valuable discussion took place at the Los Angeles meeting and it was proposed that the membership of the Consumers Service Bureau meet frequently for general discussion of the activities engaged in by each of the central stations represented. It was thought that these meetings would be beneficial, in that the knowledge of the work of the different companies represented, might be passed on to the other companies. It was also thought that a general discussion along these lines would develop new ideas that could be used by the entire membership, to good advantage—the ideas so developed being passed on at the meetings as to their desirability for general use, and after definite activities had been decided on, specific ideas could be taken home by the members and laid before the general executives of the central station companies for their consideration and adoption.

The discussion brought out that all of the central stations were attacking this problem from various angles—some sending out questionnaires to their customers, soliciting suggestions, or complaints, while others were doing the work through a house canvass. Other companies were soliciting the co-operation of their entire organization by providing all their employees with blanks, or booklets, on which they could turn in to the proper department, consumers' complaints, prospects for new business and personal suggestions for the betterment of service. In this latter activity, it was found that some of the companies were holding employee meetings for the purpose of explaining to their entire organization the vital necessity of rendering proper service to their consumers and gaining their friendship, and getting from them prospects for additional business.

It was thought that the operating organizations, particularly the linemen, line-foremen, service men, meter readers and other employees engaged in like activities, could be of definite benefit to the central stations and could materially aid in building the electrical industry generally, if they could be impressed with the proper appreciation of their ability to do this work. It has been found very desirable, where such interest has been developed, to report back to the employee turning in such information, on the action that has been taken on the information he supplied. This reporting back to the employee definitely informs him that his work is appreciated and of benefit to his company and tends to maintain his interest and to perpetuate it.

It has also been found that if the contract wiremen and representatives of other allied electrical industries, are provided with suitable stationery on which to make these reports, they will co-operate, and a much better understanding between these allied industries and central station employees can be developed.

The development of this thought led to the appointment on the Consumers Service Bureau, of men representing manufacturers, contractors and dealers, and other organizations whose opinions and experience would be valuable to the central stations, and valuable to the electrical industry as a whole, in promoting business and good feeling. It was felt that the California

*Consumers Service Bureau: A. M. Frost, chairman; Don C. Ray, George T. Bigelow, W. L. Frost, W. H. Fischer, R. C. Bragg, H. K. Griffin, J. W. Wrenn, R. L. Eltringham, Alfred May, C. B. Kenny, G. E. Arbogast, Harry Harper, D. E. Harris, R. M. Alvord, K. E. Van Kuran, E. M. Frellson.

Electrical Co-Operative Campaign should be represented on this committee, on account of their close affiliation with both the central station and the allied industries.

The first regular meeting of the Consumers Service Bureau was held in Fresno on Oct. 19, 1923. At the opening of this meeting, the chairman read the following paragraph written by Don C. Ray, and taken from his article appearing in the Oct. 1, 1923, issue of the *Journal of Electricity*.

"At no time in the history of the public service companies, has the item of good will weighed so heavily or received so much attention. It has come to be the major factor in the consideration of executives and all plans for utility development give it serious thought. With the public good will, all things are possible, but without that good will, ultimate destruction looms. This has been written boldly in the pages of the public service history and these pages have marked the passing of the old-time arbitrary 'public-be-damned' official."

With the reading of this paragraph as an inspiration to the members present, the meeting was thrown open for discussion, and many valuable suggestions were made by the members present.

The value of eliminating as much red tape as possible in our dealings with consumers was discussed. The rendering of prompt service to new consumers, by accepting their applications over the telephone and having their applications and other necessary papers delivered to them, by a service man, for signature, rather than requiring them to come to the office, was discussed. It was found that many of the companies represented were handling their service orders in this way and that much favorable comment, by consumers, had resulted.

The importance of securing thoroughly competent help to handle service work, was brought out. It seemed to be the general opinion of all members present, that the companies should very carefully select service men—particular attention being given to their appearance, personality and general fitness to deal with the public. It was pointed out that any man of proper personality, irrespective of previous electrical training, could be taught the routine work necessary to its accomplishment, but that it was a particularly difficult thing to take a man of improper personality, even though he be skilled in electrical matters, and reconstruct his personality so that he would be acceptable to the public as a representative of the utility.

The subjects of instruction and education of employees dealing with the public, were discussed and the different members present told of what their companies were doing. Some companies are handling their educational work through their employees' associations and clubs, where others are attacking it as a purely educational program, conducting schools for employees in the various departments of the company. The necessity of arousing interest on the part of the employee and pointing out to him the big advantage that he, personally, will derive by selling himself to the consumers, was discussed at some length. If an employee of proper personality is selected, there will be no difficulty in bringing about this very desirable situation.

The subjects of collections—the desirability of simplifying rates and bill forms, and the desirability of making prompt adjustments in case of error, with a full explanation to the consumer of how the error happened to be made, were discussed at some length, and several valuable, definite, suggestions were made. It was quite evident that these suggestions registered with the members present, and it is certain that many slight changes in dealing with our consumers have been brought about by the different companies, as a consequence of that meeting.

Improvement in service and a friendly contact with the consumer will do more to produce a sympathetic feeling on the part of the consumer than anything else. Company executives should frequently approach their company with the view of the consumer—putting themselves in the place of the consumer and with an open mind following through the company's requirements to obtain service, and criticizing those requirements from the standpoint of the consumer uninformed on company routine matters, rather than attempting to analyze their points from the standpoint of the man informed on the detail of conducting a utility business. Consumers must be dealt with as individuals, rather than as a group, and their individual criticisms should be considered.

A committee was appointed to obtain from all of the utility companies of the state, samples of the forms used in direct dealing with the consumers, such as cut-in, cut-out, complaint, bill, and inspection forms, as well as bill notices and notices for shut-off in case of non-payment—these forms to be studied at a future meeting, with the idea of arriving at a uniformity throughout the state, picking out the forms most desirable for accomplishing the purpose and the least offensive to the consumer.

Other activities discussed by the members present, and engaged in by the utilities of California for the betterment of relations with consumers, were:

1. Sale of company securities to the public.
2. Mailing of questionnaires asking for service criticisms.
3. House to house canvass for the purpose of receiving criticisms and making adjustments of disputed accounts, as well as the repairing of idle lamp socket devices, without expense to the consumer.
4. The attending of civic meetings and service clubs, by company representatives.
5. The attending of Farm Bureau meetings.
6. The use of moving pictures at public gatherings, for the information of consumers, on utility matters.
7. The survey of consumers' installations, both industrial and agricultural, for the purpose of informing the consumer on the use of his apparatus, as well as making efficiency tests on equipment installed, to promote a more efficient use of utility service and to promote a feeling of confidence on the part of the consumer.

The use of the word "complaint" in designating a department of printed form, was discussed, and it seemed to be the unanimous opinion of all members present that the use of the word should be eliminated. Consequently, a committee of one was appointed to investigate the psychological effect on consumers of the word "complaint," and to make recommendations at the next meeting for some other term that seemed fittingly to take its place. It is thought that a great many consumers come to us with the idea of making constructive criticism, but that they hesitate to approach the window labeled "Complaint Department," as they do not wish to see their name attached to a form carrying the designation "Complaint Tag."

The word "complaint," carries the wrong impression. It makes the consumer feel that we are looking upon him as a complainant and that he is of considerable nuisance to us. It also creates the impression that our service is rather poor, or we would not find it necessary to open up a department for the purpose of handling our numerous complaints.

The second meeting of the Consumers Service Bureau was held in Del Monte, on Jan. 25 and 26, 1924.

Discussion of the Courteous Service Club of the electrical industry, being promoted by R. A. Balzari, was entered into, and it was the opinion of all the members present, that this very definite and tangible piece of work accomplished considerable good.

The service rendered by the Standard Oil Company, the securing of their high-grade employees and their general policy toward customers, was discussed and it was thought that the electrical industry could learn considerable from studying their methods.

It was the consensus of opinion that the utility companies should make, free of charge, minor repairs to all varieties of appliances, only charging for necessary replacement parts. This work can be accomplished by trouble men carefully following up fuse troubles to determine what caused the fuse to blow, and in that way, frequently definitely locating the trouble in some particular appliance that might cause the second blowing of a fuse when put into use the second time. If not repaired, this appliance would probably be discarded, with consequent loss of revenue to the Company and the loss of service to the consumer. The careful selection of employees for this class of work was also discussed, at some length.

The committee appointed at the Fresno meeting, to find a proper substitute for the word "complaint," reported with the following suggestions offered:

Adjustment Department.
Consumers Service Department.
Correction Department.
Service Bureau.
Emergency Department.
Welfare Department.

The suggestion of a name applicable to the department to adjust complaints and offer suggestions for better service, was considered a very timely one.

One of the members present reported that his company had adopted the term "Investigation Department." Another member present reported that his company favored the term "Consumers Service Bureau."

It was the thought of the chairman that the work of the Consumers' Service Bureau is not complete, and that completion of its duties cannot be expected within the term of a year. Benefits have been derived from the discussion that has taken place at the different meetings, and it is earnestly recommended that the work of this committee be continued, next year, with the further recommendation that the Public Relations Committee have, in its membership, men fully conversant with the problems of consumers' service. A close tie-in between the Public Relations Committee and the Commercial Committee of the Association, should accomplish the results that the Consumers Service Bureau is trying for, without the necessity of possible duplication of effort, for it is recognized that the Public Relations Committee's work and the work engaged in by the Consumers' Service Bureau, very closely parallel each other.

Report of the Safety Rules Bureau

By R. H. CATES*

THE major portion of the work of the Safety Rules Committee of the Pacific Coast Electrical Association was completed during the two years prior to 1923 when the members of that committee spent considerable time and effort in aiding the different branches of the electrical industry and the Industrial Accident Commission of the State of California in formulating a set of rules that would outline the proper methods of installing electric wiring and apparatus to afford the greatest pos-

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sible amount of protection to life and property within the state. During this period tentative rules were published by the Industrial Accident Commission and after applying these rules throughout the state to determine if any radical defects were apparent a revised draft in type-written form was practically completed just prior to 1923. At this time the state budget was being revised with the result that insufficient funds were provided to complete the type-written revision of the rules in such form as to be again printed before bringing them up for a public hearing.

The Industrial Accident Commission has been working on the revised draft with a limited force throughout the year of 1923 and at this time, March 21, 1924, we are pleased to report that sufficient funds seem to be available to enable the commission to get the revised rules to the state printing department in time to bring the matter to a public hearing and have the rules printed in their final form by July of this year. During the past year the Safety Rules Committee has held one meeting at San Francisco and one at Los Angeles, but beyond discussing the rules briefly and instructing the chairman to keep in touch with the Industrial Accident Commission with the idea of assisting its electrical engineer in any way possible to get the revised rules in the hands of the state printing department, there has been very little opportunity to accomplish any real work of a constructive nature.

During the meetings held this year matters of a general nature have been discussed along the lines outlined in the proposed safety rules to a considerable length and it has seemed to be the opinion of those present that the work of the Safety Rules Committee should not be abandoned by the association until such time as it is demonstrated that the rules, when put in practice, represent the best possible practices along the lines of properly protecting the industry and the public in general against hazards to life and property.

It is to be regretted that the state has had insufficient funds to carry this work to completion at an earlier date but this condition is expected to be relieved soon.

Utility Accounting

By A. B. CARPENTER*

INASMUCH as new classifications of accounts have just in the last year been adopted, there does not appear to be any reason or necessity for changes in the present general structure. From the report and from our contact with the national body, it seems that the efforts have largely been directed toward the introduction of the national classification to the various states. There is, however, a growing necessity locally, and seemingly otherwise, for a uniform interpretation of classifications.

It is, of course, well known that a text to anything is very general and is intended to fundamentally establish a basis for the finer distribution of items with the same characteristics and for the same purposes. This is sound in principle, and if it were not for the fact that most electrical utilities cover a wide area of distribution, consequently making it necessary for a large number of people to use their own interpretation, satisfactory results might be expected. The importance of this question first becomes individual, that is, any utility which is operating over a wide area of territory will find as wide variations in its interpretations as with one company compared with another.

It is then obvious that if this is not very carefully guarded the utilities accounting will become badly confused and represent only a small degree of accuracy. It is also very important to the industry as a whole. We are fortunate indeed in having long since passed the time when it was thought necessary to keep the facts of our business hidden from others. For it is only by comparison that we can find the measure of our own efficiency.

It again becomes obvious that without a very clear understanding and an agreed upon uniformity between

companies, the comparative results would be very unsatisfactory. Therefore this committee has made it an important part of its work to carry on this study with the view of producing in as fine detail as possible a uniform interpretation of the present classification of accounts, and, while it is a big task and will require more time than the present committee has to finish the work, it is felt that such benefits will accrue to the member companies as to warrant the succeeding committee being specifically charged with the duty of its completion.

Fixed Capital Records

Member companies and particularly those in California are keeping their fixed capital records in practical uniformity and in harmony with the classification of accounts. There has arisen no new matter nationally or locally from which there came any beneficial suggestion.

Budget Arrangement

While this is a well recognized and adopted method by which to regulate internal financial affairs, investigations locally have shown the budget to be peculiar to the individual utility. We have not been informed by the national body of successful efforts to produce uniformity in budget application.

Preservation of Records

There appears to have been very little activity, either nationally or locally on this subject. This is doubtless due to the fact that it is very largely a matter which is again peculiar to the individual company.

Pay Roll Standardization

This is another subject which has offered very little material for discussion and seemingly is so with the

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national body, as there have been no suggestions from its committee.

Customers' Records and Billing

This subject for the most part has been confined to the more important aspects of comparative values of machine methods and handwork. It has received perhaps as much attention as any phase of the industry. There have been for observation very large installations of machine equipment, and from that all the way down to the one man office. There are combination installations, or systems of machine and hand methods. Some of these systems have actually gone so far as to eliminate book records. There have been extensive experiments and exhaustive investigations out of which comes an amazing amount of confusing statistical data.

Some of the large eastern companies are carrying two or three plans in trying to find the way. The unit cost of production has been found to be as variable as the differences of opinion and results of all experiments, from which there can be no definite conclusion drawn as to the distinct advantages of one method over the other. It will be found, however, that while there have been a few machine installations discarded altogether, the research work is directed more or less toward the improvement of the machine method. This would seem to show the tendency in the belief that it will ultimately be distinctively advantageous.

The machine manufacturers of course have kept pace with the progress and in collaboration with the industry some of them have recently produced machines with seemingly a great deal more capacity. Some of the companies are now installing this new type of equipment from which it is hoped and really expected more definite results will be shown than have seemingly been possible with the older type of equipment. Out of all of this, however, the committee comes to the brief conclusion that production cost should be the basis for prime consideration; that generally speaking the confusion in the available data has been brought about through the lack of uniformity in the classification of items of cost; that consumers' billing by machine methods can be recommended as being superior in many respects, including to some extent production cost; that consumers' bookkeeping by machine method has very little, if any, advantage over the hand method. (This refers to the older type of apparatus generally in use at present.)

The introduction of machine methods into the general work of the office has been done with more satisfaction than that of the consumers' department. For instance, where a company has a large volume of calculations and the work can be concentrated into the hands of a few machine operators, a very much higher production will be turned out, and consequently at a very much lower unit cost, which also relieves the more expensive help as a rule to carry on the more important duties.

There are some phases of general bookkeeping which can be very conveniently and satisfactorily adapted to machine methods. For instance, cash book work can be arranged so that the daily cash statement, bank register and cash book, and the distribution of the disbursements can be written in one operation. In journalizing, the check, voucher and journal sheet, and the necessary distribution can be written out at one operation. In those installations with which the committee is familiar the output is just as great, and there is the satisfaction of knowing that as the work progresses everything is automatically footed and balanced. This class of work is usually intrusted to expensive help, but under the machine method it can safely be turned over to the less expensive.

For companies having a sufficiently large number of stockholders an addressograph installation will be found very satisfactory. For full period dividend payment there can be written at one operation stockholder's name, address, bank or trustee, to whom payment should be sent (if this should be the case), also number of shares of stock, date, number of checks, bank from which payment is drawn, and such other information as might be necessary. For those that have not such an installation, and where volume justifies, this method can be very highly recommended both from the standpoint of convenience and expense.

The transportation division of the Stores and Purchasing Committee submitted to the Accounting Com-

mittee a form which is designed to bring about uniformity in the classification of automobile expense. It was thought best that the two committees should reach an agreement, which, with a few minor suggestions, has been done. It is felt that where it is possible for the individual companies to use it, a great deal of benefit can be derived from comparative cost, and therefore its adoption is recommended. The form itself will no doubt be submitted in the report of the Stores and Purchasing Committee.

County Franchise Tax

A recent decision of the Supreme Court of the State of California entitled "County of Tulare against San Joaquin Light & Power Corporation" purports to interpret that portion of paragraph 3 of the so-called Broughton Act, under which of late years franchises to occupy the public streets by utilities have been granted, and the essence of which paragraph is that "during the life of said franchise the grantee must pay to the county or municipality 2 per cent of its gross annual receipts arising from the use, operation or possession of said franchise," this being effective after the first five years of the date of the franchise. The difficulty has been to ascertain what portion of the gross annual receipts arose from the use, operation or possession of the franchise and a number of seemingly equitable methods were discussed only to be found unsatisfactory to one or more of the counties or municipalities claiming a portion of the gross annual receipts of the same public utility so that to insure a uniform method, to prevent duplicate payments upon the same income and to provide for a division of the receipts amongst respective claimants, as in the case of a municipality carved out of a county subsequent to the granting of the franchise, this suit was brought. The decision of the Supreme Court leaves this method in a somewhat vague light but sets the court's approval upon the validity and workability of the act and suggests to the parties concerned a method, but not necessarily an exclusive one.

Companies not having committed themselves by agreement or previous payments or precedent of any sort or another method, it is thought will find the following plan a very good one and possibly acceptable to the interested counties and municipalities as quite a number have already agreed to it.

County	1915 System Mileage		1916 System Mileage	
	Franchise	Non Franchise	Franchise	Non Franchise
Kern	40.50	375.75	41.75	390.15
Fresno	75.30	435.25	83.30	515.00
San Joaquin	31.25	238.00	34.78	275.23
Stanislaus	25.15	143.25	26.25	153.80
Total	172.20	1192.25	186.08	1334.18
		172.20		186.08
Total Mileage		1364.45		1520.26

	1915	1916
(a) Percentage which franchise mileage bears to total mileage	12.6210	12.2490
(b) Percentage of total investment represented by pole lines	34.82	30.16
(c) Gross receipts	500,000.00	575,000.00
(d) Amount of gross receipts allocated to pole lines (c X b)	174,100.00	173,420.00
(e) Amount of receipts allocated to franchise mileage (d X a)	21,973.16	21,242.22
(f) System franchise tax (e X 2%)	439.46	424.84

Kern County

(g) Percentage which county franchise mileage bears to total franchise mileage	23.517	22.436
Amount of tax for year (f X g) distributed as follows:	103.35	95.32

	Mileage	Tax	Mileage	Tax
City of McKittrick	3.25	8.29	3.50	7.99
City of Maricopa	1.15	2.93	1.40	3.20
City of Taft	2.60	6.63	3.00	6.85
County	33.50	85.50	33.85	77.28
	40.50	103.35	41.75	95.32

For purpose of illustration names and figures have been used arbitrarily. It is contemplated in this set up that each county would be entitled to the basis from which its pro rata comes, but of course from there on can be interested only in its share of the tax, therefore each and every county would receive a complete statement changed only in respect to the report or accounting for the particular county tax, as illustrated.

Most of our member companies are, or will be, operating some of their hydro plants and appurtenant facilities as project property under license from the Federal Power Commission. Most everyone is more or less familiar with the Water Power Act, and the rules and regulations established by the Federal Power Commission which govern in the administration of the Act. The most important of these regulations perhaps are those having to do with the recapture clauses of the law and headwater improvement charges, which in the first instance brings about the necessity for the allocation of earnings and operating expenses against the particular project property. There is also involved in this question the matter of ex-appropriations of surplus earnings. In other words, if it is so determined by competent authority that after twenty years of operation there has been an excessive profit from that particular project, the excess would have to be considered as a part of the return of the investment in case of recapture.

In the matter of headwater improvements it is required that where one company operating under federal license has made improvements which are beneficial to another who is also operating under a federal license that there shall be paid a rental charge so to speak in some form or other to the company owning the improvement by the company or person receiving benefits. It can be seen that every member company affected is faced with one of the most intricate problems to work out that can be imagined. There has been a great deal of work done and study given to this question but without any particular progress toward its solution, even in the individual case.

This committee feels, however, that all member companies are entitled to, and probably will need, all the help it can get from the association, and it is with the belief that they will greatly benefit, that a continuance of the study of these subjects by succeeding committees is recommended.

Break-Downs in the Field

By W. H. FAIRBANKS*

THE subject of emergency equipment is divided into two sub-divisions, namely, break-downs in the field, and pool cars and taxicab service. These two problems are discussed separately as the relationship between the two is not very close.

Break-Downs in the Field

The matter of how to handle break-down in the field goes further back into operating practices than the subject itself implies. The actual handling of a break-down in the field is something to be cared for in accordance with the circumstances surrounding each individual break-down and in the most economical manner possible. The initial vital point here is that however the details of the repairs are handled they should be handled under instructions from the transportation department and should not be left to the judgment of the driver or department involved. In other words, the problem should always be put up at once to the transportation department by telephone or otherwise, to see how each break-down should be handled and the department to which the unit is assigned should not be given authority to go ahead and handle break-down in any fashion as best meets their ideas of what should be done.

Before discussing the technic of how to physically handle break-downs a little thought should be given as to the cause of break-downs. In practically all cases other than straight accidents, break-downs in equipment are due to some lack or defect in mechanical maintenance of the vehicle and those defects are usually the result of letting little things go until they develop with a crash into a big thing. This in turn leads to the shop practice problem of day mechanical crews vs. night mechanical crews and there is a clean-cut line of division of thought as to which is the better practice to follow. The two basic ideas of handling mechanical maintenance follow.

Day Crews

Maintain whatever day crew mechanics are necessary for both overhaul and repair purpose, and maintain enough extra equipment to care for emergency calls for break-down service. Do not maintain much, if any, night crew.

Day and Night Crews

Maintain whatever force of day mechanics is necessary to care for overhaul and miscellaneous work and maintain a force of night mechanics heavy enough to clear all trouble which has developed during the day and to tighten up the cars generally. In analyzing the advantages and disadvantages incident to both methods of operation the outstanding disadvantage of the second alternative is the fact that it is impossible to get maximum efficiency out of men working at night and also on account of the heavy labor turn-over. Other than this, the advantages of the second alternative are in its favor as against the first alternative and one great practical advantage which accrues from the second is

the fact that it practically eliminates break-downs in the field. The Pacific Telegraph & Telephone Company has been following this latter practice for several years past and a field break-down from anything other than an accident is practically unknown to it.

The consensus of opinion of the members of this committee seems to favor the night shift alternative, but the difficulties attendant to working the night shift seems to deter some of the members from attempting to follow this practice. There is a feeling that from 60 to 70 per cent efficiency is obtained out of night work as compared with day work, but this loss of 40 to 30 per cent in efficiency is far more than compensated for by the freedom from break-downs with its attendant time loss to the people who are using the vehicle.

Shop Tow Car

In physically handling field break-downs the consensus of opinion seems to be that a shop tow car equipped with tools is correct and that on report of break-down this car should be sent out at once with the necessary mechanics to make road side repairs. If the break-down is serious it is, of course, necessary to also send out a relieving vehicle. The necessity for such relieving vehicle can almost always be determined from the first telephone report. It should always be borne in mind that the big unseen factor of cost incident to break-down is the loss of time and demoralization of the people who were using the broken down vehicle and all efforts should be centered on getting these people at work as soon as possible.

Pool Cars and Taxicab Service

It is necessary to give a little thought to the basic principle underlying the furnishing of passenger car automobile service and the underlying principles to be followed are ones to be determined by the management only. In other words, there are certain organizations,—notably a large commercial company,—that furnish their employees with touring cars and roadsters for business purposes, but that also allow these employees to take their cars home and to all practical purposes consider such cars as the employees' private property while off duty. This practice is followed to a greater or lesser extent by some other larger organizations, but the universal consensus of opinion among utility people is that it is a bad practice to follow and that passenger car automobiles should be considered in the same light as any other tool and are to be used for business purposes only. This being so, it is very highly desirable that by far the greater bulk of passenger car equipment be used during working hours only and this equipment should be garaged at night in company garages rather than at the home of the individuals. This being so, it is obvious that a number of marked economies can be effected by having one car serve the needs of as many people as possible instead of assigning the car to the exclusive use of one individual. The present practice of one company is as follows:

The entire list of employees who use passenger cars is carefully scrutinized and studied and a list is made

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up of those people who need a passenger car all the time. To such people a certain car is exclusively assigned. The basis of this study is the kind of work these people are on, whether or not they are in the field approximately 100 per cent of the time, what amount of traveling is necessary when they are in the field and what other economical means of transportation are available to them such as street cars, stages, etc. In addition to this some very few of the high placed executives are assigned exclusive use of certain passenger cars.

Pool Service

People whose use of automobiles is spasmodic and irregular are not assigned exclusive automobiles, but are instructed to use pool car service. In Los Angeles one company has a pool service consisting of a fleet of approximately sixty passenger cars, these passenger cars being Fords, Chevrolets, Dodges and three Buicks. The three Buicks carry permanent chauffeurs and the balance of the fleet do not. When the need arises for the use of a car by some person to whom a car is not exclusively assigned, this person secures from his supervisor a team order which states the employee's name, where he is going and the approximate length of time the machine will be out. The information on this team order is then telephoned to the garage dispatcher and a specific car is assigned the employee. The employee then presents the team order to the garage attendant at the place where the machine is housed and receives the machine from the attendant. The employee will also sign out on the team order and the garage attendant will time-clock stamp the team order and note on the team order the speedometer reading. When the car is later returned the employee signs off on the team order and the garage attendant time-clock stamps the team order in and notes the speedometer mileage in. By this means there is a complete record of the length of time the employee kept out the car and the actual miles traveled. A study is made day by day of the results as shown on these team orders and if any unnecessary use has been made of the car the attention of the department involved is called to this fact.

The use of this system has given excellent economical results. There is, of course, more or less friction to overcome and the whole thing has been a campaign of education of employees as to when to use an automobile and when not to use one. Previous to the establishing of this system the company rented a large number of cars from employees and in one instance alone (the three Buicks and drivers) the placing in service of three cars did away with the rental of approximately ten cars. The Buicks in question are used by the higher supervisors and the thought in providing chauffeurs for these cars is that a supervisor should concern himself mentally with the problems of his particular position rather than to be obliged to concentrate on the problems incident to city driving and traffic. Many people personally enjoy automobile driving and as a consequence some of the supervisors do not altogether agree with this theory. At the same time the theory seems sound from almost any angle. The use of these chauffeurs also tends to greatly lessen the improper use of company equipment. The Dodges, Chevrolets and Fords are used by the rest of the employees and the class of car which is assigned to any particular employee is contingent upon the kind of position which such employee holds with the company.

Another excellent result along economical lines obtained from this pool service is in the increased mileage from the individual cars. Nearly everyone is familiar with the high percentage which fixed charges bear to the total operating expense of any car—these fixed charges in the case of passenger cars running anywhere from 55 to 70 per cent of the gross operating charges. One company is operating some 200 Ford touring cars and roadsters. Of course, many of these cars are assigned exclusively to individuals but, despite this fact, the use of the pool system of touring cars and the elimination of 100 per cent assignments where the mileage did not warrant such assignment has increased the average mileage for the whole Ford fleet from 700 miles per month to 900 miles per month. This, of course, reflects itself in lowered operating costs.

It is of course understood that this pool and taxicab system is of value only in places where there is a large concentration of employees with the attendant large use of passenger cars. This scheme probably would not work in small centers and its use is not as yet attempted in places where only two or three cars are involved. In this connection the general superintendent of the Consolidated Gas Company, of New York City, has just been on a tour of inspection through the West and says that his company has such a scheme in New York City, and that they find it a big money saver for them. They are using a fleet of about 125 Buick "4" touring cars, all carrying chauffeurs.

Maintenance and Operation of Automotive Equipment

By J. M. WAINSCOAT and O. M. SIMPSON*

MAINTENANCE and operation—methods of repairs, shop practices, service systems, including lubrication and washing—being a very broad subject, embracing almost all of the operation of the transportation department from beginning to end, it is thought it could best be served by securing information from the various public utilities as to their practice and the submission of a condensed report of the information thus obtained.

Accordingly, a questionnaire was prepared and sent to a number of the leading public utility companies of the state. Replies were received from the following:

Pacific Gas and Electric Company
Great Western Power Company
Department of Public Service, City of Los Angeles
Southern California Edison Company
Southern California Telephone Company
Los Angeles Gas and Electric Corporation
San Diego Gas and Electric Company
Southern Sierras Power Company
San Joaquin Light and Power Corporation

From a careful analysis of the replies received from these companies it is found that their policies were generally very much different upon any one subject and that it would be impossible to make an intelligent and comprehensive digest of their methods that would be suitable for a committee report.

Inasmuch as this is a very important subject, it is thought a thorough discussion should be given to all these questions in order to enable the committee to formulate a comprehensive and definite report for some future meeting.

The following is a list of the questions and the condensed answers prepared:

I. (a) Equipment coming in for repairs.—Is it inspected by someone to determine whether it is cheaper to repair or sell and replace with new?

Answer:—The policy of most of the companies is to inspect cars brought in for repair to determine whether they should be repaired or replaced.

(b) How does your company determine the life of a car and when it should be replaced with new?

Answer:—The policies of the various companies are widely different on this subject; however, several favor a system of determining the life of a car by its operating cost and condition. It is observed that there is considerable difference as to what would be the right time in the life of a car to dispose of it. For illustration, some of the companies favor using cars for as much as from two to ten years, while others favor a much shorter usage.

Generally, it has been the experience of the San Joaquin Light & Power Corporation that it is far more economical to determine the life of a car by the mileage it has run and what it costs per mile at a given time.

(c) What method is used as to the amount of money to be spent in the repairing of a car when it comes in for repairs?

Answer:—On this question the various companies are pursuing widely different methods, generally having no definite way of determining amount to be expended on cars for repairs.

A preferred method, it would seem, is to judge a car by its relative operating cost to a group of cars of the same class, giving consideration as to topography of the country over which the car operates.

For illustration, assume a group of 100 Fords to average in maintenance cost 4c per mile, up to 20,000 miles. Should a car jump to 8c per mile within the 20,000 miles, it is apparent that it is costing too much to operate and care should be exercised about making expensive repairs on such a car.

*Sub-Committee on Maintenance and Operation: J. M. Wainscoat, chairman; O. M. Simpson, W. J. Schaefer.

(d) Does your company rebore and completely overhaul motors and chassis?

Answer:—In this question information was sought as to whether the companies followed a policy of reboring and completely overhauling all classes of equipment.

It was found that all were doing this class of work with the exception of the San Joaquin Light & Power Corporation, which does this work on trucks and high priced cars only, and on them in as limited extent as possible.

(e) Does the foreman inspect all cars as they come in for repairs and as they go out completed, or is an inspector or working foreman employed to do this checking?

Answer:—All of the companies inspect cars coming in for repairs as they enter and leave the garages. The foreman does the inspecting.

(f) When a car comes in for repairs, are only those repairs made that are requested by the driver, or is the car checked over and all necessary work done? How is the driver cared for if he cannot wait until his car is finished?

Answer:—All the companies say they do all work necessary each time a car comes into the garage for repairs, instead of doing only what the driver may request.

The question as to what arrangement is made with the driver of a car that goes into the shop for repairs was intended to gather information as to the system of handling swing cars, followed by the various companies; all answers were to the effect that the driver was provided with another car.

(g) How does your company service cars with gas, oil and tire inflation?

Answer:—Practically all companies maintain the system of servicing cars independent of the drivers whenever possible. In outlying districts, the drivers are supposed to look after their own cars.

(h) What check have you to see that all cars are properly oiled and greased, and how do you handle the greasing and oiling of cars?

Answer:—One company sends out cards notifying drivers to oil and grease. Two others use stickers on the face of speedometer showing last speedometer reading or date when the car was greased. Others depend upon their garage foreman and drivers to watch the cars and have regular forms or charts to check this work.

(i) What set-up have you to determine when a car is to be washed?

Answer:—The information sought through this question was as to who had authority to order a car washed and as to who is held responsible for having the car washed.

A number of companies have no well defined system to determine the necessity or time for washing of cars. Others require truck drivers and chauffeurs to watch this detail and perform the work, holding them responsible for the appearance of the cars. Cars without regular drivers are cared for by the shop foreman.

(j) Do you wipe off and clean the windshields on all cars stored in garage at nights?

Answer:—All of the companies except two, wipe off and clean windshields at night on cars stored in garage.

(k) What method do you use as to the painting of cars?

Answer:—Policy varies widely. Some companies have no standards in this regard whatever. They paint when the appearance of the car and convenience for doing the work seem to justify it.

Two companies have standardized on color for repainting of cars.

II. (a) Have you some set-up for handling extraordinary charges against the equipment such as wrecks, burning up of motors, etc.?

Answer:—All of the companies except one, handle charges of this nature the same as any other maintenance expense.

The Pacific Gas and Electric Company charges fires and wrecks to depreciation reserve.

(b) Does your company call for bids from the different dealers when they want to trade in their old cars for new?

Answer:—All of the companies except two, call for bids on cars to be sold.

(c) Do you take any salvage from the old car before putting it up for sale, such as removing the good tires and special company equipment replacing them with old tires and standard car equipment?

Answer:—All accessories that are special company equipment are removed. As to anything else being removed will depend upon whether it is possible to improve the trade by doing so.

Automotive Labor Saving Devices

By P. H. DUCKER*

THIS committee desired to present only such labor saving devices as relate to motor vehicles or allied equipment and this report will cover only those devices which have been perfected and thoroughly tried out by the various utility companies adopting them. It is not the intention at this time to cover the matter thoroughly but to give a few ideas as to what may be accomplished along these lines.

The following labor saving devices, brought up at this time, are the most interesting and desirable. Briefly, they are as follows:

Loading and Unloading Heavy Material.

In loading and unloading five ton trucks the cost of labor in handling material often exceeds the entire cost of the transportation charge but, with the aid of a power take-off on the transmission, attached to the winch on which is coiled a steel line having a gipsy head mounted on the end of the shaft, the methods of loading and unloading heavy weights from trucks is reduced to a minimum. This winch is also adaptable and desirable to the loading of heavy transformers or pieces of machinery on trailers and in buildings.

Care of Small, Light Material, Small Tools, Etc. on Trucks

Most of the utility corporations have difficulties in taking care of small hardware, tools, records, and one of the most serviceable and accessible types of bodies is that shown in one of the accompanying photographs.

Pumping Water from Man-Holes on Underground Systems

During stormy weather, one of the chief difficulties encountered by the electric companies to maintain service is the pumping of man-holes on underground systems. There has been designed a centrifugal pump which is usually attached to the front of an automobile by which the operator is enabled to use the motor of the vehicle in operating the pump to empty the man-holes.

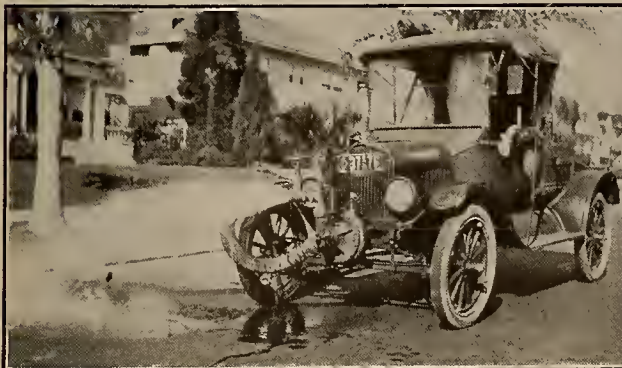
Extra Heavy Duty Trailers

To those companies requiring the use of a ditch digging machine, the accompanying photograph clearly shows a very satisfactory trailer for moving this type of apparatus from one location to another. The chief point of interest in this particular trailer is the detachable front axle together with the unique manner of using four wheels on the rear axle.

Trailer and Equipment for Handling Three Heavy Reels of Wire

In handling wire in either stringing or taking down lines, the use of a trailer capable of carrying three reels at once, each weighing approximately one ton, is quite necessary. After a great deal of experimenting, the trailer shown in one of the accompanying pictures was designed and equipped as shown in another picture.

*Sub-Committee on Automotive Labor Saving Devices: P. H. Ducker, chairman; F. W. Smith, S. B. Shaw, W. H. Fairbanks, F. C. Rotzel.



(Left) Centrifugal pump attached to front of automobile and operated by the engine of the car. (Right) Container designed for taking care of small tools, records, etc., on automobiles.

This arrangement complies with all state laws and other regulations and allows the cable to be put under cover when not actually in use during construction period.

Boom for Handling Poles

Another picture shows a truck to which has been attached a power take-off having two gipsy heads extending on either side of the truck directly behind the cab. The boom is adjustable to take care of short or long poles. It will be noted that for safety reasons hemp rope has been used in all cases where the boom or lines were liable to touch any live wires when poles were be-

ing set or removed. This truck, in connection with the trailer makes a combination that has been found to be very valuable.

Trailer for Handling Cable Reels

Some of the companies are required to handle their heavy reels of cable in such a way that the loads may be shifted readily.

One photograph indicates a two wheel trailer which is so arranged by having a drop axle and rack on which an axle placed through the center of the reel rests allowing the reel to revolve when the trailer is placed in a horizontal position, lifting the reel from the ground.



Types of automotive labor-saving devices in use by California electric utilities.

Authorization and Assignment of Automotive Equipment

By J. S. MOULTON*

THIS sub-committee of the Transportation and Labor Saving Devices Committee was formed to investigate the methods employed by the various California utilities in requesting, approving and furnishing automotive equipment. Following the plan decided upon in the main committee, a recommended plan has been formulated from the practices in use, attempting to incorporate the good points and to eliminate the poor ones, or the ones which seemed applicable to only special circumstances. Of necessity, such a plan must be general in character and capable of modification in detail without change in principle if it is to be fitted into the varied organization set-ups.

The preliminary plan suggested for the consideration of the main committee follows:

Requests for and Approvals of the Supplying of Equipment

The request for equipment should emanate from the department or individual wishing the equipment, and be approved by the district (or division) manager or general office department head under whose jurisdiction the car will operate. The request should then go to the transportation department, which will,—

(a) Supply equipment, if on hand, to replace equipment temporarily out of service or for emergency use of short duration.

(b) Approve request for additional equipment if such can be furnished without purchase, indicating size and type of equipment to be furnished if request is finally approved.

(c) If additional equipment is to be purchased, the transportation department will ascertain the makes and costs of equipment meeting the requirements of size and type and make recommendations for purchase of make of equipment which, as shown by their records and in their judgment, is best suited for the work proposed.

The request, in cases (b) and (c) will then go to a designated individual, preferably a member of the executive staff who will have the authority to call for any information from any department which he may desire in investigating the need for the equipment. The principal reason for having this individual a member of the executive staff is that the chances of any inter-department friction are eliminated and the disapproval of the request, if such is the case, will be accepted without appeal. This individual will investigate the need of the equipment and make any comparisons of performance between the various districts or departments which, in his opinion, will show whether or not efficient use is being made of existing facilities and the necessity for additional equipment. He will also pass upon the make of equipment the transportation department recommends to keep the types furnished comparable between uses of like importance or prestige. Approval of the request at this point should make further approval in most cases a matter of routine.

The request may be passed from this point to the central office head of the department desiring the equipment, if this head has complete authority over the department, or directly to the general manager, if the control is more nearly centralized in his office. Upon approval of the general manager the request will go through whatever accounting routine is necessary and the purchasing department will be authorized to purchase the make of equipment specified by the transportation department in case (c) or the equipment furnished by the transportation department in case (b).

Type of Equipment

The type of equipment used in construction work, service crews and meter reading, seems fairly well standardized and their choice is well known to those interested. The use of passenger cars for the various individuals requiring them does not seem to be nearly as uniform due to varying local conditions. It does not seem wise to attempt to outline a general schedule of what cars should be furnished men in different positions as this will be determined to a considerable extent by local conditions and is in many instances a matter of company policy. It does not seem amiss, however, to

suggest that there is an evident tendency in the various companies to purchase cars of a better class than have been used in the past. This practice may easily lead to difficulties in that the standard of equipment furnished will be raised throughout the company without any compensating advantages if it is not carefully watched.

Mileage vs. Hourly Rate as a Basis of Charge for Use of Automobiles

By P. H. DUCKER*

THE subject, "Basis for charge for use of automobiles,—hours vs. mileage," is one that requires a great deal of consideration before a decision can be made either way. From the replies received from the several utility companies in central station work, there is a decided difference of opinion as to which system is correct. Eight companies were interviewed; five use the mileage basis, while two have a combination of time and mileage, and one uses time basis only.

With reference to use of personally owned cars for company business, five do not encourage this,—in fact discourage it; one has no policy whatsoever, and two encourage the use of personally owned automobiles. The question of grouping cars of similar make, size and capacity, as compared with individual cars, to establish rates was also divided. Four companies are grouping cars and four use the individual basis.

In view of the fact that there is such a divided opinion,—and so evenly divided,—this committee wishes to offer for consideration the following suggestions.

Basis of Charging for Use of Company Automobiles

Practically the whole life of an automobile, owned by a public service organization, is used up through the number of miles the car is driven and not through any particular length of time it is owned by the company. Therefore it is recommended that a rate be established for automobiles for each mile the machine is driven, this rate to be made up of two parts:—first, the operating charge; and, second, the depreciation and overhead charge, the sum of the two being the service rate. The operating rate will be composed of the cost of gasoline, lubricating oil, tires, repairs, and other charges strictly accountable to operation. The depreciation and overhead rate will be made up of the figure based upon the life of the automobile, plus such overhead charges as taxes, interest, insurance, etc.

It is the opinion of the committee that this scheme is proper for the reason that the age of the machine together with the style and type of car, should not have a direct bearing on its use by the company in its business. By this we mean that a Pierce Arrow touring car that was built in the year 1916 and has only been driven 10,000 miles is as good for company use as a Pierce Arrow car built in the year 1922 that has also been driven 10,000 miles, assuming that both have been kept in the same mechanical condition.

Records for Depreciation and Hazard

It is recommended that a record of each automobile be kept on the books as a separate unit but that the cars be grouped into the various makes and sizes and that a separate rate of charge for mileage be set up for each group. We believe by this system there will be an equitable balancing at the end of a given period allowing the rate to be kept to the average on all jobs and not charging one particular job on the system a higher rate due to some one or two automobiles having been operated by careless drivers at excessive costs, while the rest of the cars in same group have been operated on a reasonable basis.

This committee is of the opinion that there should be some rate set up to accumulate a reserve to take care of accidents and wrecks in which individual automobiles are concerned. This account could be made a clearing account and if at any time there is an abnormal charge made against a certain piece of equipment due to some accident, this charge will not be reflected in the usual rates shown on the books as a cost for operating that vehicle; in other words, it would be in the nature of insurance.

*Sub-Committee on Authorization and Assignment of Automotive Equipment: J. S. Moulton.

*Sub-Committee on Basis for Charge, Hours vs. Mileage: P. H. Ducker, E. M. Rondot.

The Arrangement and Storing of Materials

By C. A. KELLEY*

LOCATION of storerooms and storage yards will depend, to a great extent, upon the territory that is to be served and the accessibility to transportation lines. Buildings should be of fire proof material, properly ventilated and well lighted, both natural and artificial lighting being considered. The ideal building is probably of the one story type, without basement. Where ground space will not permit of one story construction proper elevators and gravity chutes should be installed. The floor should be of concrete and should be built to a car floor level if practicable. One section of the storehouse, that part set aside for the handling of very heavy material, should be equipped with traveling overhead crane, etc.

Proximity to railroad trackage is essential and convenient spurs should be arranged for, that carload shipments may be unloaded directly into the warehouse. Where plenty of space is available covered platforms and docks should be built on the track side to facilitate the unloading and handling of carload shipments. The issuing side of the storehouse should be provided with the necessary platforms, covered, built truck high so that the loading of trucks may be expedited.

When it is necessary to store stock such as poles, timbers, lumber, heavy pipe, tanks, etc., a well protected yard should be provided. This yard should be enclosed with a suitable wire fence preferably of heavy woven wire and of sufficient height to protect the property in the enclosure. When possible this yard should be surfaced, or at least that part to be used for roads and drives, and proper drainage should be provided. Covered sheds of corrugated iron can be utilized for storing bulky material not easily affected by weather and floor space so saved in storerooms can be used for other purposes.

Expansion should be given due consideration. Space that seems adequate today will be congested in a few years unless some plans are made for future growth. This pertains to all the different departments of the storeroom, office, receiving department, issuing department and the different sections of the stock rooms, etc., as well as to buildings, sheds and yards. Streets, alleys and railroad trackage should also be considered in this connection.

Arrangement

Arrangement of storehouses and yards, and the different subdivisions of same, is of the utmost importance and particularly the stock rooms and the material placed in the bins and upon the shelves. Upon an ideal arrangement depends the rapid issue of the material and the speed at which an inventory can be taken. There should be a designated place for each item and that place should be labeled, giving proper description of the article. As much of the stock as practicable should be kept in the original containers and these should be segregated as to classification, neatly piled and labeled and so stowed that inventory can be readily made at any time. Unit piling is recommended as it makes the counting much easier and expedites the taking of inventory.

We endorse last year's report which recommends the practice of sectionalizing store stock for convenience of storage and issuance of materials and we feel that the classification of articles should be made according to the nature of the article and the use to which it is to be put. Lumber should be stored near the carpenter shop, iron and steel near the blacksmith shop, pipe and large reels of wire near the shipping department, in order to lessen time and labor required in handling for shipment. Where practical, small fast moving items are put up in standard packages, to facilitate handling both at store and place of final use, outside departments ordering in this manner. Obsolete material should be segregated from useful stock.

Stock Book

The committee recommends for the control of material and supplies a stock book system to be used in

addition to the stock card or stock ledger. The use of the stock book, compelling monthly inventory and checking of outstanding orders, puts the storekeeper in a position to keep his stock at a proper level. It makes it necessary for him to keep his stock in a better physical condition and it calls particular attention to inactive and obsolete stocks. The stock book sheet should be of suitable size for convenient handling when bound in book form and to properly show the following information: description of item, purpose for which required, case reference and bin number, unit, weight, average monthly consumption, quantity on order and on hand first of year, and for each month of year the quantity on hand, unfilled requisitions, quantity ordered, requisition number and date, date received.

Symbols

The use of numbers or symbols to assist in the arrangement and location of material in storerooms and the finding and handling of same after storing is to be encouraged but we do not recommend the use of symbols to designate the article to the exclusion of its proper name.

Receiving Department

A separate department should be provided for the receipt of material and all material should be handled through this department. Material upon receipt should be promptly forwarded to the proper section or department of the storeroom where it is to be stored.

Shelving

For ordinary storeroom purposes it is believed that wooden shelving properly built will serve the purpose and be less expensive than the metal shelving now on the market and will not increase the fire hazard to any great extent. Shelving should be uniform and of such height that material on top shelves can be reached from the floor without the aid of ladders. The aisles between the shelving should be wide enough to permit the moving of warehouse trucks. The shelves should have strips wide enough for the indexing of any material thereon and should be so arranged that there will be no strips or facings to aid in the accumulation of dirt. Also, sufficient width should be provided on the lower shelf which may be used as a counter and some method should be adopted that will enable the storekeeper to make rapid count of items in stock on the shelves. This can be accomplished by the use of trays, pans or the tying up of small items in standard packages or the arrangement of items on the shelves in uniform manner so that checking can easily be done. This may cause some additional work at the outset but it is believed will more than pay for itself eventually at the time of issuing stock or taking inventory.

Shelving should be well constructed, suitably strong to serve the purposes for which selected and well painted so that cleaning may be facilitated and appearance improved. Light colors should be used preferably so that the light will be reflected and dark colors used only on the part that is used as counter. A system of labeling should be installed that will indicate the name of the item stored on the shelf and this should show the same designation as used on stock records. The stock should be arranged on shelves in sections, in the same order as carried on stock records. This arrangement facilitates locating items and is a distinct advantage at inventory time.

Storage of Inflammables

All empty boxes, crates and packing materials should be stored in such part of the warehouse as will best protect the stock and reduce the fire hazard to a minimum. When large quantities of this class of material are necessarily kept on hand, storage should be provided in a separate building. Paints, oils, varnishes, gasoline and other inflammable items should be segregated from other stock and methods adopted to safeguard them. Underground storage of oils is not to be encouraged on account of difficulty in locating leaks in tanks and repairing same and, in some cases, on account of liabil-

*Storing Bureau: C. A. Kelley, chairman; Fred Hendrickson, C. B. Lore.

ity of surface water getting into the tanks. Tanks built above ground are easily inspected and leaks are soon discovered.

Responsibility

There should be one person who has the supervision of all the different storerooms if more than one are maintained by a company. All the storekeepers should look to this one person who, in turn, should be held responsible for the management and upkeep of the storerooms as well as the material and supplies of the organization.

Personnel

The employees of the storerooms, as far as possible, should be men who have had practical training in store-room work and who have a feeling of responsibility in the handling of property. Unauthorized persons should

Disbursements and Returns

By H. O. McKEE*

THE handling of all materials, equipment and supplies of all departments of a company, including those carried on material trucks, shall be under the direct supervision of the stores department. Accounting for all materials, equipment and supplies shall be the responsibility of the stores department, each store carrying its own stock ledgers. All materials, equipment and supplies, whether purchased on regular purchase order, or emergency purchase order, shall pass through the materials, equipment and supplies accounts. All materials, equipment and supplies shall be actually installed in the line, or in the job, before being charged out by the stores department. The same careful attention shall be exercised in handling and accounting

The image displays four forms from the Southern California Edison Company. The top-left form is a 'FIELD BALANCE SHEET' with fields for 'Truck No.', 'Truck Function', 'Work Ending', and '192'. It includes a table for 'MATERIAL' with columns for 'IN', 'MADE', 'TYPE', 'A.W.', 'SERIAL NO.', 'PRICE', 'QTY', 'ISSUE', 'TYPE', 'A.W.', 'SERIAL NO.', 'PRICE', 'QTY', 'ISSUE'. The top-right form is a 'District Store Invoice-Credit' with fields for 'No. 61726', 'Change to', 'DISTRICT', 'ODD', and 'ODD'. It includes a table for 'REMARKS' with columns for 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS', 'REMARKS'. The bottom-left form is an 'AUDITOR'S COPY' with fields for 'EXP. NO.', 'APPL. NO.', 'DISTRICT', 'No.', 'DATE', 'QUANTITY', 'DESCRIPTION OF MATERIAL', 'PRICE', 'UNIT', 'AMOUNT', 'QUANTITY', 'PLAN'. The bottom-right form is a 'District Stores Invoice-Debit' with fields for 'No.', 'DATE', 'QUANTITY', 'DESCRIPTION OF MATERIAL', 'PRICE', 'UNIT', 'AMOUNT', 'QUANTITY', 'PLAN'. It includes a table for 'TOTAL DEBIT' and 'TOTAL CREDIT'.

Disbursement and return forms used by the Southern California Edison Company.

be excluded from storehouses. Their presence only adds to the confusion incident to the receipt and issuing of material and errors are more likely to occur when employees' attention is distracted by outsiders.

Equipment

The equipment to be used in the storeroom office such as typewriters, calculating and adding machines and other labor-saving devices should be up to date and kept in good condition and should not be cast off equipment of some other department. Suitable equipment should also be used in the storeroom proper for the handling of materials and supplies and selection of the proper type is important. This applies not only to elevators, cranes, chutes, etc., but to trucks, scales and other tools and equipment necessary for handling, unpacking and packing of material.

Replenishment of Stock

Where the stock book is used the storekeeper can readily figure what his wants will be for the monthly requisition and where a stock book is not kept some other means must be devised to keep the stock up to requirements. This can be handled in different ways such as the use of indicators on the stock card itself or a separate file which can be used as an order list. When records are in such shape that the average of monthly consumption can be determined with any accuracy the stock record should show the maximum and minimum quantity to be kept on hand for each item. Stock should be moved in rotation to avoid deterioration. This applies particularly to all items that are affected by climatic conditions.

for junk or scrap materials, equipment and supplies, as is given newly purchased materials, equipment and supplies.

A standard form shall be used as a requisition and invoice,—prepared in sufficient copies to meet requirements,—to cover disbursements between the general store and the district store. A combined form of requisition and invoice shall be used also for back orders—materials not shipped on regular requisition and invoice. Disbursements made from general or district store to line gang shall be handled on forms prepared in such a manner as to cover issues and returns for a period of one week. Copies of these forms shall be carried by the storekeeper as well as by the material clerk or line foreman on the truck. As material is placed on the line, the material clerk or line foreman will make up a report on the proper form showing quantities used on, or removed from, the line—a separate report to be made for each capital and maintenance account. From this report the store invoices shall be prepared charging or crediting the line and crediting or charging the store account with materials handled.

Daily disbursements of gasoline and oil shall be carried on a form covering company and individually

*Disbursements and Returns Bureau: H. O. McKee, chairman; O. M. Simpson, Wm. Maddock.

†EXPLANATORY NOTE: Reference is made to goods handled as materials, equipment and supplies, rather than materials and supplies. To designate wholesale distributing warehouse the report uses the term "general store." Sub-stores and division stores are referred to as "district stores." Reference made to "stores department" covers the department handling and accounting for materials, equipment and supplies of a company. The report has been condensed,—omitting the details covered by the report of last year on "Disbursements and Returns."

owned cars operating in company service for a period of one month; balanced and invoiced at the end of the month, charging each car with amounts used. Miscellaneous or emergency issues to individuals or departments not using the above mentioned forms shall be handled on a form or sub-requisition.

Materials returned from the line to the general or district store, whether usable or junk, shall be reported on the same form as mentioned above and if not re-used on the line immediately shall be returned to the store in the manner hereinbefore described. Scrap and obsolete materials should also be reported on these same forms. From these forms store invoices shall be prepared charging or crediting the line, or crediting and charging the store with the materials used or handled. At the close of each week the line foreman on the truck hands the storekeeper an actual inventory of materials left over on the truck, and the correctness of this inventory figure is determined by the balance of the previous week's work arrived at in the following manner: All materials installed on the line are inserted on the debit side of the line gang requisition, and materials taken from the line are entered on the credit side of this form, thus charging the line gang with all materials taken from the store, plus those taken from the line, and giving them credit for all materials installed on the line, plus all materials returned to the store. The difference should equal the inventory as turned in by the line gang foreman on the truck.

Return of materials, equipment and supplies by individuals or departments not using above mentioned forms shall be handled on a special form provided for the purpose. Materials, equipment and supplies returned to the general store from district store, substations, construction jobs, etc., should be handled on a form authorizing the transfer of materials and giving specific information as to whether new, second hand, scrap or obsolete materials, identifying description, proper accounts to be credited and original cost.

Forms should be provided for use of general store in placing requisitions for materials, equipment and supplies on one district for use in another district to reduce surplus stock, thus saving shipping from general store. Sales of materials, equipment and supplies through general stores, where there are no sales or commercial departments, should be covered by regular requisition and invoice charged through Sundry Accounts Receivable ledger, covering both sales to the public and employees. In district stores no sales shall be made, but will be taken care of by commercial office, materials, equipment and supplies sold being charged by the store to the sales department on regular store invoice at cost price to the store. The sales department will add the necessary overhead percentage.

When materials, equipment and supplies are returned direct to the dealer, a form for recording the return shall be used and a copy sent to the audit department giving description of material, original purchase order number and date, name of dealer, prices, etc., in order to insure receipt of proper credit for material returned from the dealer. Materials, equipment and supplies, over, short or damaged shall be covered by a form prepared in such a manner as to embody all information necessary for submission to dealers, railroads, and other carriers.

The Combined Requisition and Purchase Order

By C. A. KELLEY*

THE feasibility of combining the requisition and purchase order in one form appears upon first study impracticable and of no material saving in its adoption. The Purchasing and Stores Section, when it first discussed the project, voted unanimously, with the exception of representatives of the two companies using the same, against the combined form. These representatives adhering to the benefits, persuaded the section to refer the matter back to a special committee for further investigation and report.

*Purchasing and Stores Section: C. A. Kelley, chairman; C. R. Eccles, J. L. Gray, F. F. Henry, John H. Hunt, Leigh S. Jones, William Maddock, D. P. Mason, H. O. McKee, William J. McCullough, George C. Robb, Frank W. Smith, R. E. Thompson, C. D. Weiss.

In order to carry out the combination a suitable form should be provided; the original eventually to be used as the purchase order to conform to the standard purchase order form as adopted by this section, and should have a sufficient number of carbons to provide copies for those members of the organization needing same. The number of copies would vary according to the organization although possibly an original and four carbons will fit the needs of most companies. The details of the forms of the carbon-copies must necessarily conform in part to the original, but those spaces needed on the original for information peculiar to the order only, may be occupied on the carbon-copies by any information desired.

The principal benefit to be derived by combining the requisition and purchase order is in cutting down the number of times the articles requisitioned need be written and insuring accurate details from the requisitioner for the material wanted as well as doing away with the possibility of altering that description by transcribing.

The requisitioning source is expected to give the information as to the quantity, size, dimensions, make and quality of the material called for. In other words it provides an adequate description of what is required so that it may be intelligently purchased. This procedure will eliminate quite a bit of detail in the purchasing department, leaving time therein for more important matters. After the requisition is made up, the person requisitioning should retain one carbon for his information, forwarding the original and other carbons through the proper organization channels to the purchasing department. The purchasing department should fill in the original and such carbons as the routine requires, with the name of the vendor and such additional data as necessary to complete and should then sign and forward to the vendor. The purchasing department should retain the duplicate for its files and distribute the others according to routine.

As stated above the combination saves considerable clerical work in the purchasing department by doing away with the continual detail of transposing the list of articles. It is not true that this change is merely transferring that work from the purchasing department to the requisitioning source, for in the most elementary systems of requisitioning undoubtedly two copies are made and a few extra copies would add little to the work. It is true the requisitioning source may have to write more requisitions as articles of different classes could not be entered on the same sheet of the combined form, however, entering a mixed list of articles on the same requisition is poor practice even if the combined form is not used and the realization at the source that what one writes is to go to the vendor without correction will impress upon the person wishing material a necessity for greater care in ordering. Such a plan will tend to classify the material used in an organization along proper lines and will likewise tend to standardize articles to be used. A combined form will use one number throughout, thus assisting in the identifying of all communications both within the organization and with the vendor and transportation company without. It will save filing space in the purchasing department, at least, and will bring together all the matter with reference to an order.

By using this form for emergency orders through a slight deviation from the established routine, it will enable the purchasing department to have more immediate control and supervision of emergency purchase orders. Under this form the requisitioning source may fill in the vendor and deliver the original copy at once. The remaining forms taking the usual routine will, however, reach the purchasing department while the matter is still fresh and give the purchasing department an opportunity to offer such criticism as may be called for to an advantage that would not accrue under any emergency purchase routine now in effect.

The opinion of the section is that while the details of the adoption of this form may necessitate difficulties according to the organization of the different companies and the routine prevalent therein, yet the combined form has many advantages which continued use will make more apparent. The section recommends its adoption by member companies and urges at the time that the form of the order follow the standard purchase order form with the number in the upper right hand corner.

A Study of Underground Systems

By R. C. POWELL*

THE subject of heating of underground conduits has been under discussion by this committee for several years, but, due to the limited test data available, no definite conclusions have been reached. It is evident that all companies operating underground systems of any size must make systematic temperature surveys to avoid either excessive maintenance from burnouts or excessive capital expenditure resulting from underloaded cables.

The question of the heating of conduits has recently become a very important one to several of the larger member companies who now find it necessary to transmit underground, in one run, blocks of power of the order of 50,000 kw. or more. Two companies have made preliminary investigations on this subject including laboratory and field tests. The results obtained to date are not sufficiently conclusive for publication but indicate that the number, size and loading of cables in a conduit run of standard type are determined by a total maximum loss of 60 watts per ft. of conduit. Under certain unfavorable soil conditions this figure will be reduced to 50 watts per ft.

Studies are now being made to determine definitely, (1) the heat dissipating characteristics of the standard

1—Avoiding expense of standard manholes and conduits. This has been done by installing most of the secondary system along back fence lines or in the sidewalk area with a single iron pipe for conduit and small concrete service holes.

2—By joint construction with the telephone company.

Where underground distribution is installed for residence tracts, the property or tract owners pay for the increased cost above that of overhead distribution by installing the conduit system complete ready for cables, transformers, etc., and deed same to the power company. Each property owner installs underground service at his own expense. Following is a brief description of a system installed by a member company ten years ago at the expense of the tract owner to supply a 30-acre tract subdivided into 135 lots.

Two standard transformer manholes were installed in the street which ran through the center of the tract. The conduit system consists of 2 in. black iron pipe laid along the back property lines and connects fifty-five concrete holes 30 in. long by 19 in. wide and 15 in. deep. The secondary cable consists of about 1,700 ft. of No. 1-0 Duplex and 6,000 ft. of No. 4 Duplex lead covered cable. The neutral is No. 4 weatherproof. The cost of this system complete excepting services was \$35 per

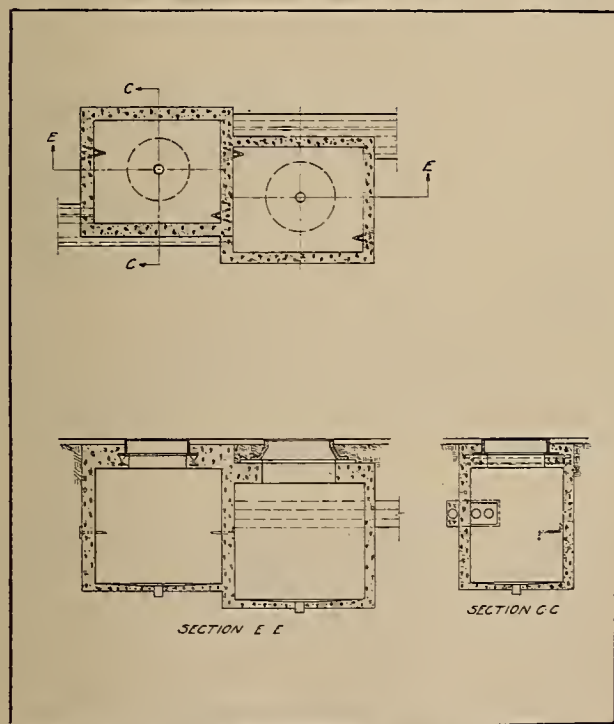


Fig. 1.—Joint power and telephone manhole construction.

type of conduit, (2) if construction having greater heat dissipating ability can be designed, and (3) what can be done in the matter of cooling for the present standard type of construction.

Low Cost Underground Construction for Residence Districts.

In order to satisfy the demand for underground distribution in certain high grade residence tracts, companies have found it necessary to devise forms of construction cheaper than that employed in the heavier loaded districts. Experience has shown, however, that it is not possible to depart very much from standard practice. For example, attempts to use unleaded cables have, with very few exceptions, been unsuccessful. Reduced costs have been obtained in general by one of the following means:—

*Underground Systems Committee: R. C. Powell, chairman; K. B. Ayres, W. R. Battey, Clayton Biggs, M. O. Bolser, George M. Bowman, P. E. Chapman, R. R. Cowles, Geo. H. Hagar, N. B. Hinson, C. H. Jenkins, D. J. Kelly, H. G. Keesling, Raymond Lewelling, O. C. Miller, H. H. Minor, R. G. Sheppard, Vinton Smith, Ellis J. Willits.

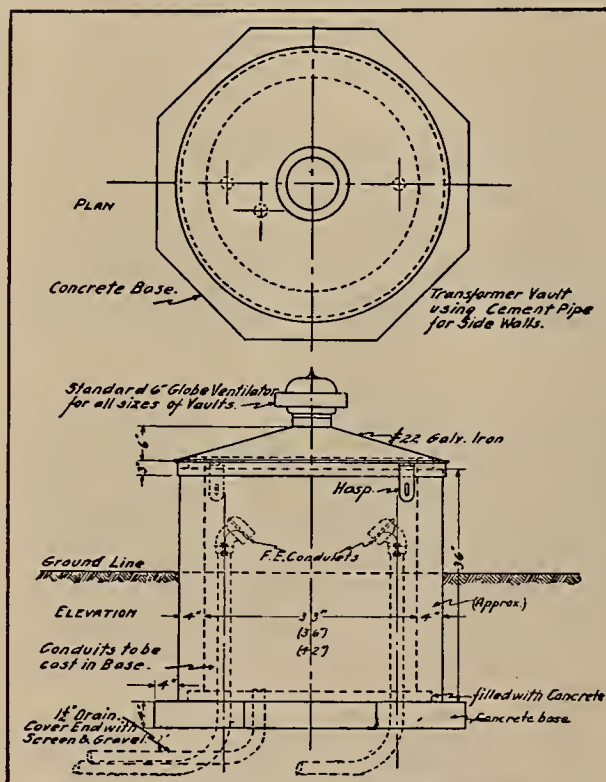


Fig. 2.—Transformer vault construction.

lot, which under present day costs would be \$70 per lot.

Two companies, with a large amount of residence underground, report that a joint construction of low cost has been worked out with the telephone company. Both companies employ the same type of construction of which the following is a description.

Manholes.

Concrete is generally used and the most common size is 4 ft. x 5 ft. x 5 ft. deep, inside dimensions. A 26 in. head with double cover for sealing is used. No reinforcing is used except in roof for supporting the head. One common wall is used between the light manhole and the telephone manhole. Manhole excavations are usually made in the street where the earth is undisturbed so that the earth wall serves as the exterior form. Two collapsible wood forms are set in the excavation with separation for the common wall and the concrete is poured around them. The side walls and roofs are made at one pouring and the heads are permanently

placed to grade just prior to street paving. A tile sump is placed in the floor and pulling eyes are set in the side walls for cable pulling. The telephone and light manholes are placed end to end with a slight offset to facilitate ingress of conduits from a common trench as shown in Fig. 1. The manholes are placed at intervals varying from 300 ft. to 450 ft. depending on the lot size and closeness of proposed residences. In some hillside tracts where sharp curves are frequent, manhole adjustment is made to facilitate cable installation.

Vaults.

The vaults are the same as manholes with the following exceptions:
The inside dimensions are 5 ft. x 6 1-2 ft. x 6 1-2 ft. deep. A 30 in. head is provided to receive transformers of 50 kva. or smaller capacity. Vaults are placed at locations to permit fairly short secondary lines reaching all consumers. It seems advisable to limit secondary runs to about 600 ft.

Conduits.

Three-inch fibre duct seems to be in most common use. The light and telephone conduits have a 6 in. separation with 3 in. concrete envelope. The usual conduit section is two light ducts and one telephone duct, though sometimes it is increased to five duct section where feeder lines are required. Both light and telephone service conduits are placed in a common trench. Many installations are 1 1-2 in. galvanized iron conduit, though 2 in. fibre laid with 3 in. concrete envelope is frequently used. The service conduit is laid from the manhole to the property line at a point in line with a proposed residence. When the residence is built, the consumer continues the conduit from the property line to the main line cabinet. Where more than two 90 degree bends are placed in service conduit, the consumer must place a pull box in some accessible location to facilitate drawing in service cable.

Overhead to Underground Connections.

Fibre duct laid in 3 in. concrete envelope with 3 in. galvanized iron bend in concrete at pole with 3 in. galvanized iron riser is in use. Manhole and conduit systems are generally placed in the public streets to permit greater accessibility and less inconvenience to consumers.

Cable System.

Three-conductor lead-sheathed cable is the usual primary circuit serving residential tracts. Some companies are using all lead with waterproof systems in vaults, while others are potheading and using varnished cambric open primary buses for connections to transformers. Single conductor lead sheath secondary cables with bare neutral are in common use. Service cables are generally lead covered with weatherproof neutral, and wiped to the secondary cables in the manholes. Many of the old installations have rubber covered wire services fused to the secondaries through service boxes. This method is unsatisfactory because of the rapid deterioration of the rubber insulation underground.

Junction boxes are not in general use in residential systems because of the large cost. Sectionalizing of primary lines is usually done by means of disconnecting potheads, or disconnector lugs inserted at the pothead. Some companies are using oil cutouts with subway transformers on all lead waterproof installations, while others adhere to enclosed-type fuses and pole-type transformers in the smaller sizes and subway-type in larger sizes.

Fig. 2 shows a form of transformer vault used by one company. In the district where these are used, the residences have extensive grounds and are served by individual transformer installations supplied by primary services.

Three-Phase Underground Distribution

This is a very live subject due principally to the development of high speed elevators using alternating current motors or direct current motors supplied by field controlled generators driven by alternating current motors. It will be necessary in the future to supply a large amount of three phase power in territory now supplied largely or entirely by direct current or in territory supplied by single phase with only incidental three phase. A number of systems have been installed

or proposed, and the aim of a large number of those working on this problem is to devise a system which will have (1) the reliability of the Edison direct current network and (2) to supply both single and three-phase loads from one secondary system.

A system being discussed quite extensively consists of a 115-volt four-wire Y-connected three-phase secondary network fed by transformers connected to three-phase primaries. The voltage of these primary circuits may be either 4,000 or 11,000. The transformers are connected to the network through switches which automatically open upon failure of the primary supply and are automatically closed when the primary supply is resumed.

The network is fed by a sufficient number of primary feeders and corresponding transformer banks so that failure of a feeder does not interfere with service. Furthermore, during light load periods primary feeders may be opened at the station and, since the transformers are thereupon automatically cut off, a saving in core losses may be effected.

This system meets the conditions of network reliability and single set of secondaries but has the serious

SIZES AND THICKNESSES OF INSULATION AND LEAD									
600 VOLTS WORKING PRESSURE (All Conductors to be round)									
SIZE	PAPER INSULATED - LEAD COVERED						VARNISHED CAMBRIC INSULATED FLAMEPROOF BRAID		
	1 Conductor		2 Conductors		3 Conductors		1 Conductor		
	Ins.	Lead	Ins.	Lead	Ins.	Lead	Ins.		
2000 M	4/32	9/64							4/32
1500 M	4/32	1/8							4/32
1000 M	3/32	1/8							4/32
750 M	4/32	1/8	4/32	1/8					4/32
500 M	4/32	3/32	4/32	1/8	2/32 x 2/32	1/8			4/32
250 M	3/32	3/32	3/32	1/8	2/32 x 2/32	1/8			4/32
1-0	3/32	5/64	3/32	3/32	2/32 x 2/32	3/32			
2	3/32	5/64	3/32	3/32	2/32 x 2/32	3/32			
4	3/32	5/64	3/32	3/32	2/32 x 2/32	3/32			

RUBBER INSULATED-LEAD COVERED									
SIZE	1 Conductor		2 Conductors		3 Conductors		Control Cable 5, 7, 9 or more conductors		
	Ins.	Lead	Ins.	Lead	Ins.	Lead	Ins.	Lead	
2000 M	1/8	9/64							
1500 M	1/8	1/8							
1000 M	7/64	1/8							
750 M	7/64	1/8	7/64	1/8					
500 M	3/32	3/32	3/32	1/8	3/32	1/8			
250 M	3/32	3/32	3/32	1/8	3/32	1/8			
1-0	5/64	5/64	5/64	3/32	5/64	3/32			
2	2/32	5/64	2/32	3/32	2/32	3/32			
4	2/32	5/64	2/32	3/32	2/32	3/32			
8	3/64	1/16	3/64	1/16	3/64	3/32	3/64		3/32
10	3/64	1/16	3/64	1/16	3/64	3/32	3/64		3/32

Table I.

disadvantage that, with the normal single phase voltage of 110 to 120 volts for lamps and heating devices, the three-phase voltage for motors is only 190 to 208. If motors are not to be operated at reduced voltage, the motor manufacturers must bring out a line of 200-volt motors, compensators must be provided to raise the voltage, or the single-phase voltage to neutral must be raised to about 127 volts. Furthermore, with a voltage to neutral of 120 volts or 208 volts delta, special elements must be provided for large heating loads.

In order to obviate these disadvantages, one company provides two secondary networks, one 127/220 volts for power and the other 110/190 volts for lighting. Both are supplied from the same banks of transformers, the voltages for the power secondaries being raised by means of compensators placed in the manholes or vaults with the banks.

A number of companies are employing single-phase 3-wire secondaries for lighting and single-phase power, small 3-phase power from open delta secondaries by running a so-called power leg fed by a transformer from another phase, and large 3-phase loads by individual banks which in time may be interconnected by 3-phase secondaries to increase reliability. The proper system for any company to use depends a great deal upon local conditions and the form and extent of the distribution system that is now used.

Standardization of Sizes and Thicknesses of Insulation and Lead.

Most companies have found it desirable and economical to limit the number of sizes of cables purchased and it is believed that the industry will profit if all companies will use a common standard. A questionnaire

SIZES AND THICKNESSES OF INSULATION AND LEAD							
2500 VOLTS WORKING PRESSURE (All Conductors to be Round)							
PAPER INSULATED - LEAD COVERED							
SIZE		1 Conductor		2 Conductors (Fig. 8)		4 Conductors	
		Ins.	Lead	Ins.	Lead	Ins.	Lead
1000 M		6/32	1/8				
750 M		6/32	1/8				
250 M		5/32	3/32	5/32	1/8	4/32 x 3/32	1/8
2/0		5/32	3/32				
1-0		5/32	3/32				
2		5/32	5/64	5/32	3/32	4/32 x 3/32	7/64
4		5/32	5/64	5/32	3/32	4/32 x 3/32	7/64

4500 VOLTS WORKING PRESSURE							
CONDUCTOR		PAPER INSULATED LEAD COVERED		VARNISHED CAMBRIC INSULATED FLAMEPROOF BRAID		30% HEVEA RUBBER INSULATED LEAD COVERED	
		3 Conductors		1 Conductor		1 or 2 Conductors	
Size	Shape	Ins.	Lead	Ins.		Ins.	Lead
2000 M	Round			6/32			
1500 M	"			6/32			
1000 M	"			6/32			
750 M	"			6/32			
500 M	"			6/32			
500 M	Sector	4/32 x 3/32	1/8				
400 M	"	4/32 x 3/32	1/8				
250 M	Round	4/32 x 3/32	1/8	6/32			
1-0	"	4/32 x 3/32	1/8	6/32			
2	"	4/32 x 3/32	3/32	6/32			
4	"	4/32 x 3/32	3/32			6/32	
10	"						1/16

7500 VOLTS WORKING PRESSURE			
CONDUCTORS		30% HEVEA RUBBER INSULATED LEAD COVERED	
Size	No.	Insulation	Lead
8	1 or 2	8/32	5/64

Table II.

covering this subject was sent out. The following information was received.

- 1—Do you follow a standard specification for ordering insulated cable?
- Four of the six companies to whom this questionnaire was sent have standard specifications which cover their practice in ordering cable.
- 2—Do you use all sizes of wire and cable, or is it your practice to use only the more common sizes that are carried in Pacific Coast stock?
- All companies eliminate to some extent certain sizes of cables.
- 3—Do you adhere closely to manufacturers' recommendations as to thickness of insulation and lead sheath?
- All companies adhere quite closely to the manufacturers' recommendations, but most companies add more insulation than the manufacturers specify.
- 4—What are the different voltage ratings of cable that you use?
- Most of the companies adhere closely to the manufacturers' classifications, which are:

- 600 volts and under
- 600 volts to 1,500 volts
- 1,500 volts to 3,000 volts
- 3,000 volts to 5,000 volts
- 5,000 volts to 7,500 volts
- 7,500 volts to 13,500 volts
- 13,500 volts to 18,000 volts
- 18,000 volts to 21,000 volts

- 5—Do you use both varnished cambric insulation and impregnated paper insulation in high voltage cables?
- Most companies use impregnated cable with lead sheath. However, a few use varnished cloth, and several in submarine work use rubber insulation.
- 6—Is it your practice to demand certified test reports on all orders of cable, both electrical and mechanical?
- Only three of the six companies specify test requirements.

SIZES AND THICKNESSES OF INSULATION AND LEAD							
11,000 VOLTS WORKING PRESSURE							
CONDUCTOR			PAPER INSULATED LEAD COVERED		VARNISHED CAMBRIC INSULATED FLAMEPROOF BRAID LEAD COVERED		
			Ins.	Lead	1 Conductor		1 Conductor
Size	Shape	No.			Ins.		Ins. Lead
1500 M	Round	1	10/32	1/8	10/32		
1000 M	"	1	10/32	1/8	10/32		
750 M	"	1	10/32	1/8	10/32		
500 M	"	1	10/32	1/8	10/32		
300 M	Sector	3	6/32 x 4/32	9/64			
400 M	"	3	6/32 x 4/32	1/8			
400 M	Round	1					10/32 7/64
250 M	Sector	3	6/32 x 4/32	1/8			
250 M	Round	1	10/32	7/64	10/32		
2/0	"	1	10/32	7/64			10/32 7/64
2/0	"	3	6/32 x 4/32	1/8			
2	"	1	10/32	7/64	10/32		
2	"	3	6/32 x 4/32	7/64			
6-8 or 10	"	4-6 or 8	6/32 x 6/32	1/8			

*For street lighting circuits only

Table III.

7—Do you specify that the sheath shall have a certain small percentage of tin or other metal?

All companies specify commercially pure lead on small or medium size cables, but in cables of large diameter there are some companies that specify a small percentage of tin in the sheath.

It is the opinion of the committee that it is entirely feasible for all the companies to agree upon a standard specification covering the sizes, thickness of sheath in lead covered cables. This, however, will take further time but should be concluded by the next committee.

Tables I, II and III give the standards in use by one of the larger companies. These, with certain minor revisions, have been in use for several years with satisfactory results.

Employment Methods of the Electric Utilities of California

By S. C. HAVER, Jr.*

THIS report is based on information obtained by means of a questionnaire sent to electric utilities of California. The following eight companies replied, six of which gave more or less complete information:

- Coast Counties Gas & Electric Company
- Great Western Power Company
- Pacific Gas and Electric Company
- San Diego Consolidated Gas & Electric Company
- San Joaquin Light & Power Corporation
- Southern California Edison Company
- Southern Sierras Power Company
- Western States Gas & Electric Company

General Organization

Five of the larger companies report centralized employment, three of them under a comprehensive personnel department organization, the fourth principally along the lines of employment work with some other personnel functions and the fifth along the lines of employment for certain departments only. Some of the smaller companies have a junior executive who is delegated to look after employment matters. The nomenclature "Personnel Department" is generally used, the manager of the personnel department reporting direct to the general manager. One large company uses "Employment Department" and "Supervisor of Employment."

The personnel or employment department has general supervision of all employment for the company and handles all classes of applicants. Remote districts usually hire locally under its supervision. With one company the employment department serves only certain departments of the company, other departments doing all hiring on an independent basis. Employment for construction is frequently handled on a more or less independent basis although one company reports complete organization of special employment offices for this class of hiring.

Records

The following records are generally maintained in the personnel or employment department.

*

Application for employment

*

Record of physical examination

*

Reference letters and replies

**

Notice of employment

*

Progress reports

**

Change of rate

**

Change of occupation

**

Termination of service

*

The original goes to the personnel department—copies to other departments if information needed.

**

The original goes to paymaster for payroll records with copy to personnel department.

One company reports all records filed with payroll department.

Method of Listing Vacancies

Three companies require that all vacancies be listed with the employment department, but two companies make listing optional. Two companies require that re-

*Personnel Committee: S. C. Haver, chairman; (R. J. Baker, chairman, resigned), G. L. Bell, H. Dewes, R. C. Eccles, W. H. Ellison, E. J. Kendall, E. G. McCann.

quisitions for help be made in writing with detailed specifications of the job but the more general practice seems to be to handle orders and job specifications informally, usually by telephone. The department ordering invariably fixes the rate, the employment department acting in an advisory capacity only.

Methods Used in Securing Applicants

Companies having employment departments show an intelligent use of all available sources. The following methods used are named in the order of their preference as a source of satisfactory applicants.

1. Introduced by employees.
2. Calls at employment office.
3. Help wanted "ads."
4. Schools and colleges.
5. Hired direct on the job.
6. Private and public agencies.
7. Scouts and handbills.

Where the employment department is well organized many jobs are filled from applications on file.

Methods of Selection

All companies require a written application. The responsibility for selection rests with the department placing the order. No company reported the use of trade, clerical or mental tests to any extent. Reference letters are not considered as dependable information but inquiries are made of former employers after hiring, as a check in regard to honesty and accuracy of statements made on application. Three companies reported requiring physical examination for all positions, one company requires examination for all positions in the permanent organization but makes exceptions in some cases of construction labor.

Function of Employment Department After Hiring

The employment department usually assumes the responsibility of giving the new employees general information in regard to the company's policy and employee activities and introduces personally or by note to the department in which they are to work. Three

companies have a regular follow-up system as to employee's progress. The others follow up informally when practicable. One company is undertaking a very comprehensive job analysis and rating system.

Transfers

Three companies require all transfers from one department to another, to be made through the personnel department. Two companies do some work along these lines but their system is not complete.

Terminations

Terminations are generally initiated in the department where employee works. Three companies require approval or review by personnel department before termination is effective and all companies but one consider the personnel department as a court of review or appeal in any case of dismissal.

Shipment to Construction Job

Various methods are followed in regard to handling shipments, depending upon the labor market conditions. As a general rule the fare to the job is advanced when necessary. Refunding this fare in 30, 60 or 90 days is resorted to as a measure to assist in getting men when labor is scarce. Sometimes "free fare" is offered as an inducement. Employment of train-riders to see that shipments get through to destination is frequently resorted to, especially in the case of large shipments. One company has effected a considerable saving in the cost of securing labor over a considerable period of varying labor conditions, by shipping without train-rider, fare advanced, deducted, no refund. Baggage is checked to camp destination to protect against men leaving the shipment enroute.

Summary

Companies which have had experience with centralized employment departments seem satisfied with results so far attained and the tendency seems to be toward further centralization. One company is now installing a complete personnel department and expects to work out a systematic employment plan. Smaller companies are adopting modified plans for handling employment work along those lines.

Central Station Power in Competition with Fuel Engines

By W. C. JOHNSON*

THE subject assigned covers all types of fuel engines. It was decided by the sub-committee, however, that for the purposes of this paper only such engines would be considered as might offer competition to central station power. On this basis gasoline engines were eliminated from consideration.

Gas Engines.

In general, gas engines only furnish competition where natural gas is available and then only when the installation is so located as to have gas available at a very low cost, or at no cost. It is the experience of California oil companies who have used gas engines that in order to get adequate reliability and reasonably low maintenance, units must be limited in size to about 300 hp. This means a large fixed charge for an installation of any considerable size.

The figures of one California oil company, that has an installation of some 500 kw. in several small units, where a charge of 5 cents per 1,000 cubic feet of gas is made, show a cost of 1.08 cents per kw-hr. for power generated.

Where small gas engines are used directly to mechanically drive their load, and where the gas available can be considered as having no value, no general statement which would be generally accepted can be made as to the lower cost of central station power. Figures available, however, definitely lead us to the conclusion

that even under these circumstances central station power can in many cases be demonstrated to be cheaper than "free gas."

Steam Engines and Steam Turbines.

The sub-committee was agreed that steam engines, and steam turbines furnished competition for central station power only under one of the following special conditions:—

(a) Where a considerable amount of steam is required, in any event, for heating or other plant processes.

(b) Where fuel is available in sufficient quantities, for which there is no sale, and which, if not burned under the boilers, would have to be burned as waste.

No general statement can be made relative to business falling under the above two classifications. Each installation would have to be considered as an individual problem to determine whether or not in that particular case the total cost of central station power would be cheaper than the private plant.

One thing is certain, however, and that is that today installations of this character go in with electric drive, and all past experience indicates that ultimately such installations go on the lines of the central station.

In many cases where steam is used for plant processes it can be shown that electric power itself can be used for heating, and the whole process so improved that power cost is a minor consideration.

For the small plant with waste fuel such as the planing mill, central station power can usually prove

*Sub-Committee on Central Station Power in Competition with Fuel Oil Engines: W. C. Johnson, chairman; W. F. Neiman, P. P. Pine, M. Rhine, H. H. Fogwell, J. H. Cunningham, A. A. Watson, A. G. Cage, J. F. Pollard, C. B. Merrick.

itself to be cheaper than the private steam plant and a market for much of the supposedly waste fuel can frequently be found.

The lumber mill where suitable quantities of slab or hog fuel are available is the place where the steam plant will usually make the best showing. For large enterprises of this character, however, the power requirements are such as to make the steam plant a considerable central station in itself. Under these circumstances it would seem reasonable to predict that in many cases a power company will take over the purely central station end of the business, buying fuel from the lumber company and selling them their power requirements. As this would usually result in the plant being tied in to the power company's system as a whole, such an arrangement should be mutually beneficial to the central station and the lumber company.

Diesel and Semi-Diesel Engines

Conditions will sometimes warrant an installation for standby service, even where central station power is used. It has been called to the sub-committee's attention that under these circumstances Diesel engine manufacturers have, in many cases, been pushing the Diesel engine for such standby service. Inasmuch as a relatively large part of the power cost for Diesel engines consists of fixed charges it is obvious that, where such a standby installation is made, the central station service will tend to become the standby. It would seem obvious that, where such an installation is contemplated, it should only be necessary to call attention to the fact that the Diesel engine would offer the most expensive possible form of standby service. For such an installation the prime mover that should be installed for standby service would of course be the one which could be put in for the lowest first cost, which would in no case be a Diesel engine.

The Diesel engine plant will show to the best advantage where the load factor is high. Many plants for the manufacture of ice will operate at a very high load factor and such installations would show the Diesel to the best advantage.

Plants of this character generally represent a sufficiently large investment to warrant a careful engineering investigation on the part of the ice manufacturer, and the fact that in California practically all ice plants are using central station power speaks for itself.

Some power companies report considerable competition from semi-Diesel engines in small sizes for irrigation service. In some cases full-Diesel engines in sizes around 100 hp. have also been offered for this service.

For this reason it was thought that it might be helpful for the sub-committee to compile a report showing comparative costs for such installations and this is given in the appendix.

Figures were made up for a specific location, namely, Salinas, California. The cost figures used are the best actual figures obtainable for the particular location, both for machinery and fuel.

The number of hours operation per year is typical for irrigation service, as indicated by power companies' records for this class of service.

Inasmuch as some items of cost will vary considerably with the location, and the correct values for other items will be subject to considerable difference of opinion, the exact values used for each item are given. This means that other figures for other locations can easily be substituted for those used and a proper result for any location obtained.

The sub-committee does not mean that Diesel and semi-Diesel engines can be operated for the costs given. It does aim to show, however, what the comparative costs would be, on a basis that is liberal to the oil engine, and also to present a tabulation that will make it easy for a similar comparison to be made under any other assumed set of conditions.

Plants of 25 hp., 50 hp., and 100 hp., are considered and costs computed for central station power and semi-

Diesel engines. Costs are also given for a full-Diesel engine for the 100 hp. size.

The total hours of operation per year are taken as the equivalent of 720 hours at full load.

Under these circumstances, the yearly cost of the 100 hp. plant is found to be \$2,369 for the full-Diesel plant; \$2,104 for the semi-Diesel plant, and \$1,534 for central station power. For the 50 hp. plant, the yearly cost is \$1,222 for the semi-Diesel engine, and \$840 for central station power, and for the 25 hp. plant, the yearly cost is \$681 for the semi-Diesel engine, and \$475 for central station power.

For the two smaller plants it is interesting to note that central station power would still be considerably cheaper if the fuel cost nothing.

Appendix

For the purpose of this paper three moderate sized plants were assumed, namely, 100 hp., 50 hp., and 25 hp., and the pumping load in each case was assumed to be such that the brake horse power output of the prime movers would be equal to their rated capacity; that is, they would operate at full load while running. The total time of operation per year was taken as 720 hours during an irrigation season of approximately five months and it was presumed that the plants on the average would be run eight hours per day for ninety days during the season.

In order to estimate the cost of the various type plants erected and to figure the cost of fuel and electricity, some locality had to be assumed and the Salinas Valley was chosen as the point. The investment in plant indicates the cost of the prime movers, delivered and erected, ready to operate, and the cost of housing, but does not include the cost of the well or pump machinery or necessary belt, as these were presumed to be the same whether driven by motor or engine and would therefore not alter the relative costs of central station and oil engine drive. In order to get a fair comparison of costs all cases were based on belt drive, though if motor equipment was decided upon, direct connected motors would probably be installed.

PLANT INVESTMENT, INCLUDING HOUSING
(Exclusive of Pump End)

Size Plant	Full-Diesel	Semi-Diesel	Motor
100 hp.	\$9,700.00	\$6,700.00	\$1,207.00
50 hp.	.....	\$3,900.00	\$ 810.00
25 hp.	.....	\$2,090.00	\$ 564.00

Fixed Charges

	Full-Diesel		Semi-Diesel		Motor	
Interest on investment	6	Per Cent	6	Per Cent	6	Per Cent
Depreciation	7	Per Cent	8	Per Cent	4	Per Cent
Maintenance	3	Per Cent	4	Per Cent	1½	Per Cent
Taxes and insurance	1½	Per Cent	1½	Per Cent	1½	Per Cent
TOTAL	17½	Per Cent	19½	Per Cent	13	Per Cent

Operation

The fuel required for the engine is Diesel oil weighing 6.6 lb. per gal. and the consumption per b. hp. hour will be taken as 5/10 lb. for the 100 hp. full-Diesel, 6/10 lb. for the 100 hp. semi-Diesel, 7/10 lb. for the 50 hp. semi-Diesel and 8/10 lb. for the 25 hp. semi-Diesel engine. These are believed to be very fair allowances for plants in operation for a year or more, though slightly better fuel economy may be attained on new engines. In figuring the kw.-hr. consumption of the motors, the following efficiencies were taken for full load operation: 100 hp. = 91 per cent; 50 hp. = 90 per cent; and 25 hp. = 89.5 per cent.

Fuel and Electricity

Size	Full-Diesel	Semi-Diesel	Motor
100 hp.	5,454.5 gal.	6,545.4 gal.	59,024 kw.-hr.
50 hp.	.....	3,818.1 gal.	29,840 kw.-hr.
25 hp.	.....	2,181.3 gal.	15,003 kw.-hr.

Electricity—The cost of electric power will be figured in accordance with the filed schedules of the Coast Valleys Gas & Electric Company, which apply in the territory chosen, as follows:

Rate per kw.-hr. for energy used in excess of
200 kw.-hr. per hp. per year

Size of Installation	Initial Charge 200 kw.-hr. or less per hp. per year.	Next 800 kw.-hr. per hp. per year.	Next 2000 kw.-hr. per hp. per year.	All over 3000 kw.-hr. per hp. per year.
2- 4 hp.....	\$9.90	2.5c	1.4c	1.0c
5- 14 hp.....	\$9.00	2.0c	1.2c	.9c
15- 49 hp.....	\$8.40	1.8c	1.1c	.9c
50- 99 hp.....	\$8.10	1.6c	1.0c	.8c
100-249 hp.....	\$7.60	1.5c	.9c	.8c
250 hp. or over.....	\$7.50	1.4c	.8c	.7c

In no case will the total minimum charge be less than \$19.80.

Fuel oil.—Diesel oil in tank cars (about 6500 gal.) would cost f. o. b. Salinas \$.0509 per gal.; in carload of drums (35 drums of 110 gal. = 3,850 gal.) \$.0766 per gal., and in drums less than carload lots \$.0960 per gal. As the size of the plants under consideration would hardly warrant the investment in storage facilities and the interest on the cost of a year's supply or more of fuel oil, and as a carload of drums would present similar difficulties, the price of l.c.l. shipment would be adopted as the one best applying to the conditions under consideration. In addition to the price on siding, some carrying charge would have to be added and the total cost per gal. delivered to the plant would probably be in the neighborhood of 11 cents. In the interest of simplicity, however, the cost will be figured as 10 cents per gal. delivered, as corrections can be made very easily from this figure.

Lubricating oil.—For both the full and semi-Diesel the cost will be taken as 15 per cent of the cost of the fuel oil. In the case of the motors, the cost is assumed to be \$1.00 per year, which is in excess of what it actually would be.

Attendance.—For the 100 hp. engines, about 180 hours per year of a farm hand's time would be taken and for the 50 and 25 hp. engines about 90 hours per year. For the motors (all sizes) 45 hours per year has been assumed and is considered liberal. The base rate of pay for a farm hand is taken as 25¢ per hour.

Annual Operating Cost—100 hp. Plant

	Full-Diesel	Semi-Diesel	Central Station Power
Fixed charges	\$1,697.50	\$1,306.50	\$ 156.91
Fuel or electricity	545.45	654.54	1,365.36
Lubricating oil	81.82	98.18	1.00
Labor	\$45.00	45.00	11.25
Total	\$2,369.77	\$2,104.22	\$1,534.52

Annual Operating Cost—50 hp. Plant

	Semi-Diesel	Central Station Power
Fixed charges	\$760.50	\$105.30
Fuel or electricity	381.81	722.44
Lubricating oil	57.27	1.00
Labor	22.50	11.25
Total	\$1,222.08	\$839.99

Annual Operating Cost—25 hp. Plant

	Semi-Diesel	Central Station Power
Fixed charges	\$407.55	\$ 73.32
Fuel or electricity	218.18	390.06
Lubricating oil	32.73	1.00
Labor	22.50	11.25
Total	\$680.96	\$475.63

A Study of Prime Movers

By J. G. ROLLO*

THE earliest record of petroleum oil being used as fuel for the generation of electricity, on the Pacific Coast, is found in the newspaper files of the early eighties. In the Los Angeles Express of Aug. 1, 1883, we find the following:

"At the Electric Light Works a furnace is set up for burning crude petroleum. * * * A reservoir is at some distance away, and a pipe in the form of a siphon extends into the firebox and is punctured with small holes. Heat is applied to it underneath, at the bend in the pipe, which changes the oil into gas, after which a burning rag saturated with oil is thrown into the firebox and the door closed. It immediately ignites and burns with the noise and fury of a furnace with blast on."

The Steam Atomizing Burner.

It was soon realized that in order to burn fuel oil successfully in large quantities it was necessary to break it up into small particles, and steam atomizers were shortly afterwards developed. In the early days considerable attention was given to the design of the atomizer and very little to the furnace. Inventors came forward with almost every conceivable arrangement, until the patent office had about fourteen hundred different varieties of steam atomizing oil burners on record. The steam atomizing burner is an excellent burner and the highest boiler efficiencies on record were obtained with it. However, it requires a large furnace volume for its performance and its efficiency drops off very rapidly with increased ratings. (See Fig. 1.)

In 1901 E. H. Peabody, at the Valencia Street power house, in San Francisco, departed from the usual practice of introducing the burner through the boiler front by placing the burner at the bridge wall and firing toward the front. This method allowed the expanding products of combustion to move in the direction in which the cross sectional area of the furnace was increasing, thus recognizing the importance of furnace design. But the rear shot steam burner arrangement in the standard furnace did not give high efficiencies at high ratings.

The Mechanical Burner.

Soon after the close of the European war coal prices were the highest ever known and fuel oil went down in price, due to the laying up of many vessels. Up to that time no oil burner had been developed for stationary service, which would give the high ratings of forced

draft stokers at equal efficiencies. Consequently there was a demand for a high capacity, high efficiency, oil burner. The mechanical atomizer was introduced into stationary work and developed further to meet this de-

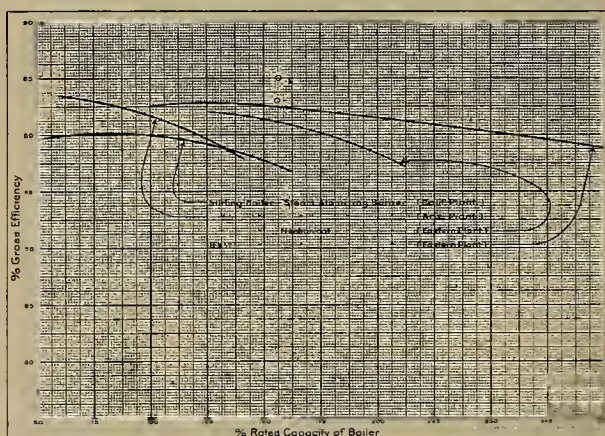


Fig. 1.—Showing efficiency of steam and mechanical atomizing oil burners at various ratings.

mand. The Pacific Coast has been slow to adopt the mechanical atomizer for central stations. The first of this type were put into operation by a member company in 1922.

The principal difficulty encountered in its operation is the maintenance of the furnace brickwork—especially the floor. Fig. 2 shows an inexpensive and effective method of protecting the floor. The best method of protecting the walls has not been determined. Some eastern companies are using water screens, such as shown in Fig. 289 of the 1923 National Prime Movers Committee report. Others are trying the air cooled wall. It is the opinion of the best engineers that if the air method protects, that it is preferable for proper combustion. The radiant superheater is being used in some pulverized coal plants for furnace side wall protection. In designing a furnace it is desirable to keep the burners as far from the walls as practicable. Figs. 3 and 4 show effects of mechanical atomizers on nearby brickwork. Engineers have suggested that direct flame impingement is responsible for most of the brickwork trouble. It is believed that if burners and furnace can be so arranged that the combustion is entirely complete before any brickwork or heating surface is touched, that brickwork troubles will be reduced to a minimum, and the highest efficiency obtained. It would be well for the committee to make some studies along this line.

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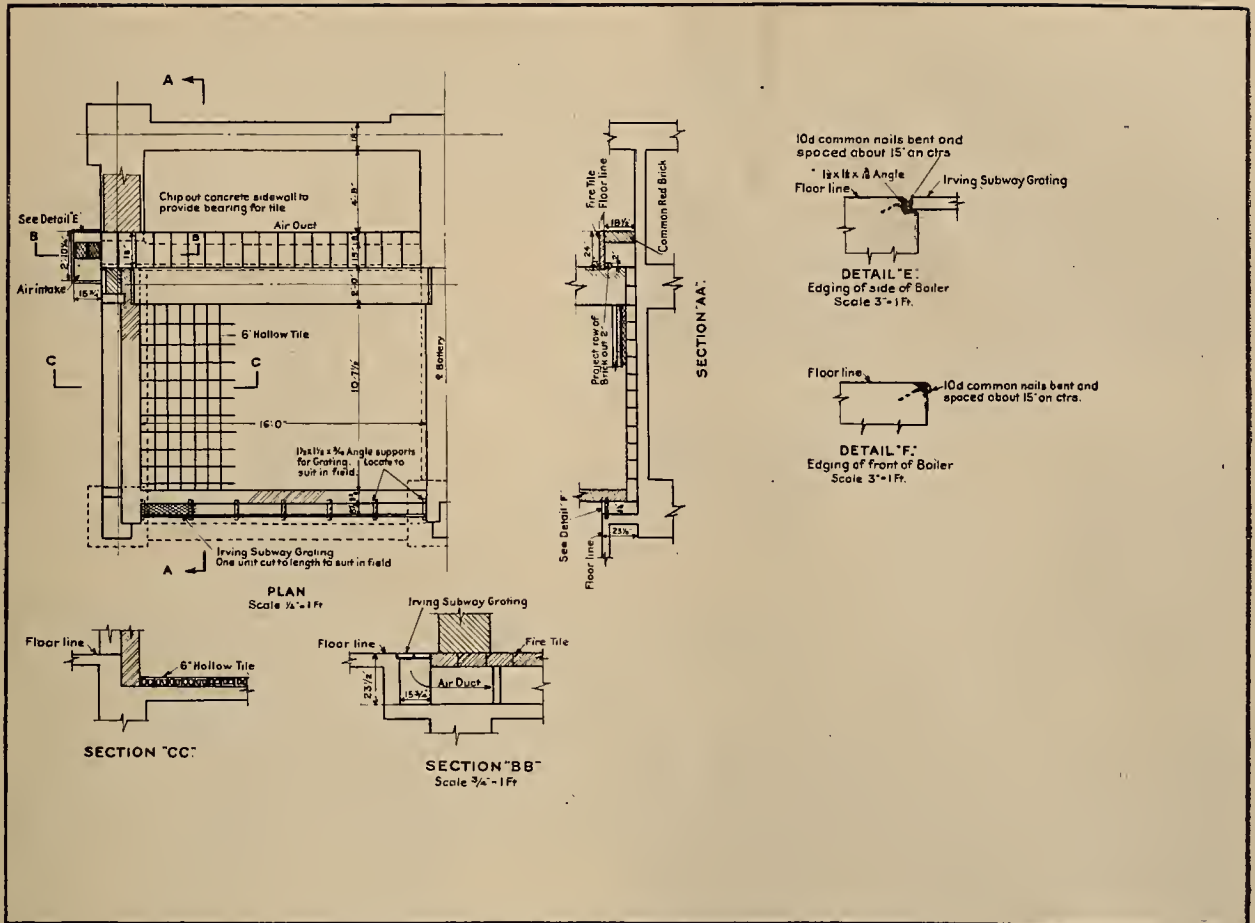


Fig. 2.—Showing effective method of protecting furnace floors by ventilation.

Furnace Volume.

All engineers agree that the general tendency in furnace design, on the Pacific Coast, has been toward insufficient volume for high efficiencies at ratings beyond 125 per cent. Just what the economical furnace volume is, has not been determined. Table I gives the furnace volumes per rated boiler horse-power of several representative plants. One company is designing a plant which will have 4.2 cu. ft. of furnace per rated hp. This installation will be of interest because of the liberal combustion space, this being about the same as used with forced draft stokers. The best design of furnace will be that one which more nearly allows the complete combustion of the fuel before the flame comes in contact with either the brickwork or the heating surface. If, by the use of forced draft or other means, the combustion can be speeded up, then the furnace need not be so deep or high, as when the process requires a

greater element of time. The shape and size of the furnace will then depend upon the amount of fuel to be burned in a given time and the characteristics of the burners used.

Automatic Regulation and Instruments

Several automatic controls have been tried by member companies but the success of these has not been phenomenal. Two members, however, report good results with the Moore system. There is a tendency in boiler rooms today to use more measuring instruments—both indicating and recording. The modern boiler room has instruments for determining at least the quantities and temperatures of fuel and water, carbon dioxide, and flue gas temperatures, besides the usual pressure gauges.

The gas burner in common use is some modification of the Bunsen. All of the companies using gas seem to

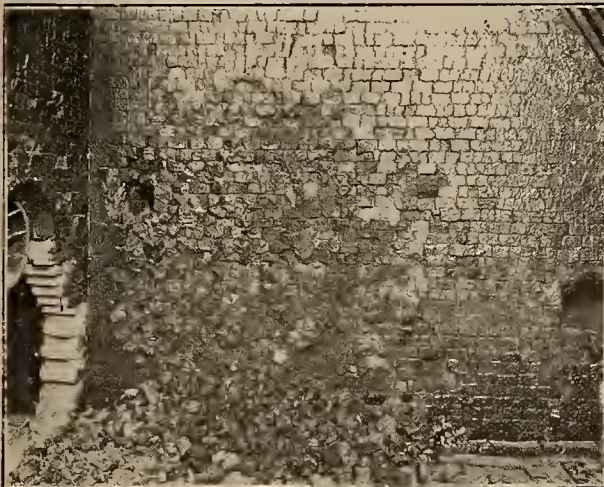


Fig. 3.—Showing effect of erosion from mechanical atomizing oil burners on side wall.

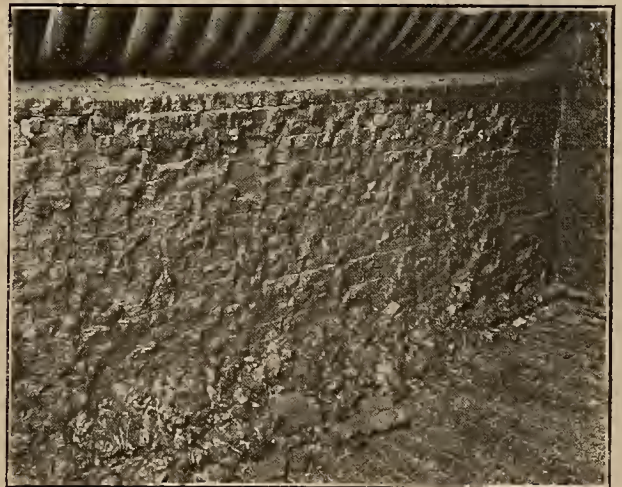


Fig. 4.—Showing effect of erosion from mechanical atomizing oil burners on bridge wall.

have tried out some of the designs on the market, and finding them not entirely suitable to their case, have developed their own. These home-made designs seem to give excellent results at home, and some very high efficiencies have been obtained with them. Table II gives results of several tests made by the San Joaquin Light & Power Corporation on their burner arrangement.

There are no particular difficulties in burning gas. The brickwork seems to last indefinitely. One company using water high in sodium salts had some trouble with priming, when the burners covered the entire floor area. This was overcome by covering only the front half of the furnace floor with burners. Small variations in the gas pressure bother in the regulation of the air supply with low pressure Bunsen burners. This can be taken

TABLE I.

Name of Company	Name of Boiler	Cu. Ft. of Furnace Volume per HP.	Usual Rating Per Cent
Southern Cal. Edison Co.....	Stirling	1.9	145
Southern Cal. Edison Co.....	Stirling	1.9	145
Southern Cal. Edison Co.....	Stirling	1.84	160
Southern Cal. Edison Co.....	B. & W.	1.3	150
Southern Cal. Edison Co.....	B. & W.	1.3	150
Pacific Gas and Electric.....	B. & W.	2.26	...
Pacific Gas and Electric.....	Stirling	2.77	...
San Diego Consolidated Gas & Electric Company.....	B. & W.	1.92	200
L. A. Gas and Electric Corporation.....	Stirling	3.01	155
L. A. Gas and Electric Corporation.....	B. & W. under construction	4.2	...

care of by installing a good regulator (of which the Chapman-Fulton is one), at each boiler, with ample size pipe between the regulator and the burners. If there is a real difficulty in burning gas it is the fact that under certain conditions the supply is liable to fail, making it necessary to keep a furnace equipped for both gas and oil burning. The problem is to keep one kind of burner from being destroyed while the other is operating. Here again the members have shown individuality and have worked out their own problems to a large extent.

Combination Furnaces

Where front shot oil burners are used a good combination is that shown in Fig. 416 of the report of the National Prime Movers Committee for 1923. The Southern California Edison Company uses the Bunsen

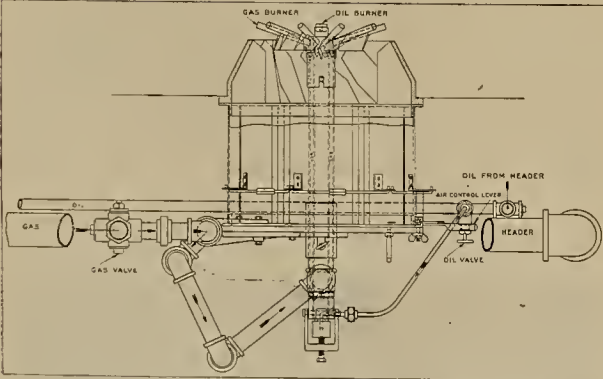


Fig. 5.—Showing combination B. & W. Santiago type mechanical oil burner and Los Angeles Gas & Electric Corporation high pressure gas burner.

gas burner in the front half of the furnace floor in conjunction with the Hammel rear shot oil burner arrangement. This combination gives good results where oil is burned infrequently and for short periods of time. If oil is burned for any considerable period (60 days), the gas burner tubes will have to be renewed. This is not expensive but means the loss of the boiler.

During the past year a combination of a Babcock & Wilcox mechanical atomizer and high pressure gas burner has been developed (See Figs. 5 and 6), which is giving satisfactory results, both as to capacity and efficiency. The test here shown is taken from a large number made on this burner, burning gas, and is believed to represent fairly well what it does in every day performance.

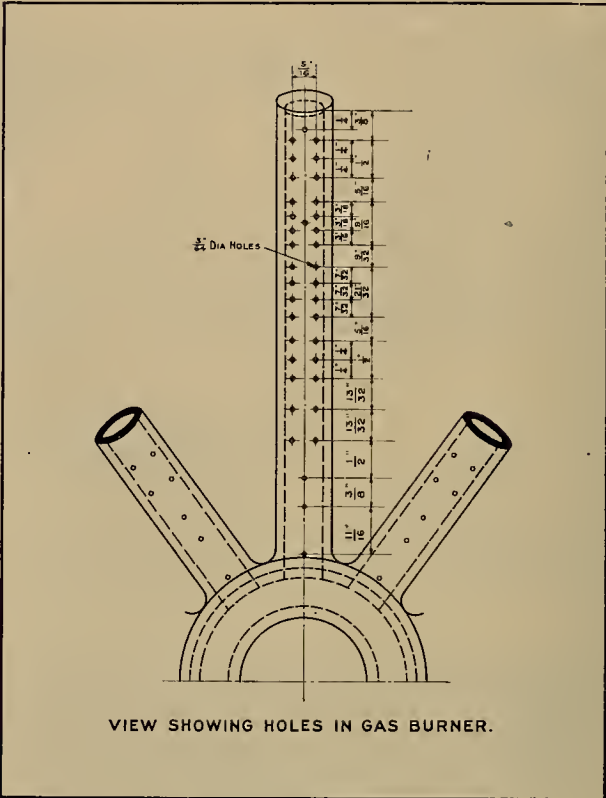


Fig. 6.—Showing holes in gas burner.

Test of Boiler Equipped with Combination Burner Shown in Figs. 5 and 6

Date.....	Jan. 31, 1924.
Duration.....	5 hours
Boiler type.....	Stirling-Integral economizer.
Number of burners.....	8
Fuel.....	Southern California natural gas.

Dimensions and Properties

Furnace volume (cu. ft.).....	2684
Water heating surface.....	8900
Superheater surface.....	1369
Economizer surface.....	2403
Ratio of furnace volume to heating surface.....	1 : 3.32

Average Temperatures, Pressures, etc.

Superheated steam pressure (gauge).....	250 lb.
Temperature of feedwater.....	195 deg. F.
Temperature of exit flue gases.....	430 deg. F.
Temperature of superheated steam.....	522 deg. F.
Degrees of superheat.....	116 deg. F.
Boiler room temperature.....	70 deg. F.
Gas pressure at burners.....	6 lb.
Gas temperature.....	70 deg. F.

Flue Gas Analysis

Carbon dioxide, per cent by volume.....	11.2
Oxygen, per cent by volume.....	2.3
Carbon monoxide, per cent by volume.....	0.0
Nitrogen, per cent by volume.....	86.5

Gas Analysis

Carbon dioxide .....	.9%
Methane	73.9%
Ethane	23.6%
Other hydrocarbons .....	.8%
Oxygen .....	.1%
Nitrogen .....	.7%
Specific gravity .....	.7%
Heat value (per cu. ft.)	1,210 B.t.u.

TABLE II. Tests made by the San Joaquin Light & Power Corporation at Midway steam plant.

Kind of burner.	San Joaquin Stirling	San Joaquin Stirling	San Joaquin Stirling	San Joaquin Stirling	San Joaquin Stirling	San Joaquin Stirling
Size of boiler	823 hp.	823 hp.	823 hp.	823 hp.	823 hp.	823 hp.
Volume of furnace.	2,000	2,000	2,000	2,000	2,000	2,000
Area of heating surface	8,230	8,230	8,230	8,230	8,230	8,230
Ratio furnace volume to heating surface.	1:4.1	1:4.1	1:4.1	1:4.1	1:4.1	1:4.1
Per cent of boiler rating.	86.5	106.1	107.0	110.6	139.0	160.0
Per cent efficiency of boiler and furnace.	79.7	80.1	79.2	82.9	81.1	77.7

Total Quantities	
Total gas used.....	312,142 cu. ft.
Total weight of water fed to boiler.....	291,075 lb.
Total heat of one pound of steam.....	1,109.9 B.t.u.
Factor of evaporation.....	1.1289
Total equivalent evaporation F. & A. 212 deg. F.....	328,595 lb.

Hourly Quantities and Rates	
Gas consumer per hour.....	62,428 cu. ft.
Gas consumed per cu. ft. furnace volume per hour.....	23.3 cu. ft.
Water evaporated per hour.....	58,215 lb.
Equivalent evaporation F. & A. 212 deg. F.....	65,719 lb.
Gas burned per burner per hour.....	7,804 cu. ft.

Capacity	
Boiler hp. (Builders rating).....	890
Boiler hp., including economizer surface @ 10 sq. ft. per hp.....	1,130
Boiler hp. developed per hour.....	1,750
Per cent boiler rating developed.....	197
Per cent rating developed based on total surface.....	155

Efficiency	
Efficiency based on gas as fired.....	85.5%

Heat Balance	
Heat absorbed by boiler.....	85.50%
Loss due to burning hydrogen.....	2.17%
Loss in dry chimney gases.....	6.37%
Loss due to moisture in atmosphere.....	.07%
Radiation and unaccounted for.....	5.89%

Sea Water vs. Cooling Tower Condenser Cooling Systems

When considering the proper location for a new steam plant somewhere to the south or southeast of and within 25 or 30 miles of the city of Los Angeles, the question of whether a coast location, with salt water for condenser cooling, or an inland location, near a load center, with a fresh water cooling system would be the better, was made the subject of considerable study. In the following paragraphs an attempt will be made to describe briefly the method of attacking the problem with particular reference to condenser cooling systems, their efficiency, reliability and operation costs.

Factors to Be Considered.

The plant sites considered were, first, a coast location much similar to the present Long Beach steam plant location, and some five miles from a load center, at which the generated energy could profitably enter the distribution system; and, second, an inland location close to the load center. The factors of land values, fuel, transportation facilities, fresh water supply, living conditions, etc., were considered equal in the two cases, leaving the problem one of balancing the extra cost of fresh water cooling systems operation against the cost of transmitting the power for five miles from the coast location to the load center.

Selection of Practical Size of Cooling Tower

A study of weather records over a period of years and some investigation of cooling tower performance, and manufacturer's guarantees, gave reason to believe that a certain cooling tower installation would give practically the same average cooling water temperatures as would be obtained with ocean water, at the expense, however, of about double the pumping costs plus other tower operation costs.

Such a large increase of cooling system operating costs would not be justified ordinarily. A compromise point at which less water will be handled and prime mover operation will be at higher back pressure may be found which will be the most economical operating point. At this point the loss due to greater steam consumption of the prime mover will be equalized by the saving in cooling system operating costs.

It must not be expected, however, that a practical cooling tower system can ever be operated at as low cost as a salt water system except under very unusual conditions. The tower system will have the disadvantage of large land area, an expensive structure, and high pumping head.

Advantages of Tower

The saving out of which the cooling tower operating expenses may come is made in transmission expenses. Another point at which a saving may be made is in condenser and pump maintenance. With salt water the corrosion and pitting of condenser tubes, pump runner, etc., is frequently severe, not only because of the corrosive action of salt water, but also because of the fact that in many cases polluted water must be used. Also the usual location of pumps and condensers above

normal water level and their operation with syphon maintained to lower the pumping head, puts a negative pressure on both pump suction and condenser tubes, causing cavitation in the pump and ready separation of dissolved gases (ordinarily some 31 per cent oxygen), in the tubes, which accentuates pump and tube corrosion.

In cooling tower systems the condenser and pump are usually so located that a positive pressure is maintained on all parts of the condenser; also, fresh water is seldom corrosive. Scaling of tubes may occur but may be prevented by proper treatment of the cooling water. Another factor to be considered is the action of salt water leakage into the condensate upon the boilers. Where evaporated feed make-up is not used this pollution of condensate may not cause trouble because of alkali salts in the make-up water.

The intake conduit system for salt water must be cleaned frequently and the intake and outlet so built as to stand wave action. Seaweed and drifting sand troubles are frequently serious. Fresh water tunnels seldom need cleaning but algae growth in the tower and basin may become troublesome, although it is usually easily controlled.

Type of Tower Considered

The type of cooling tower considered was the atmospheric type which is used where the wind blows fairly constantly. With proper wind conditions there is good reason to believe that this type will give very nearly the greatest possible cooling, hence the lowest practical temperatures. Some question as to the ability of the tower to perform as guaranteed was dispelled by tests of numerous towers in service. The inland location was situated where the ocean breeze blows nearly constantly, but not always. This factor of unreliability must be taken into account, particularly for a base load plant. The cooling is largely by evaporation so that make-up water must be supplied in amount equal to one-half to two or three times the weight of steam condensed, depending upon the loss as spray and the humidity of the air. The cost of this make-up water and its treatment must be considered.

Sample Calculation—Efficiency and Costs

For purposes of calculation we will assume certain conditions which are more or less fictitious. Land value \$500 per acre for cooling tower; basin and tower foundation cost \$25,000 per acre; pumping head, sea water 25 ft.; cooling tower system 50 ft.; steam costs 30c per 1,000 lb.; transmission lines for 70,000 kw. \$18,000 per mile; transmission losses 0.2 per cent per mile; cooling tower costs for cooling 90,000 gal. per min. 91 deg. to 75 deg., \$200,000; land required, 8 acres; power costs 0.4c per kw.-hr.

Cooling system maintenance costs, annual, 70,000 kw.

Salt water system, \$80,000.
Cooling tower system, \$20,000.
Taxes, 2%; depreciation, 4%; interest on investment, 7%.
Load factor, 92%.

Absolute back pressure—

Salt water system, 1.2 in. mercury.
Cooling tower system, 1.9 in. mercury.

Prime mover steam consumption—

Salt water system, 9.82 lb./kw.-hr.
Cooling tower system, 10.24 lb./kw.-hr.

Cooling water pumped—

Salt water system, 140,000 gal. per min.
Cooling tower system, 90,000 gal. per min.

From the above assumed values we calculate as follows:—

Cooling water pumping expense:—

Salt water system—
140,000 gal. per min., 25 ft. head, 70% efficiency.
960 kw., \$31,000 annual cost.

Cooling tower system—
90,000 gal. per min., 50 ft. head, 70% efficiency.
1,211 kw., \$39,100 annual cost.

Prime mover steam consumption:—

10.24—9.82=.42 per kw.-hr. more for cooling tower system—\$71,200 annual extra cost.

Cooling tower fixed costs:—

Cost of tower.....\$200,000
Cost of tower land.....4,000
Cost of tower basin.....200,000

Total\$404,000

Interest 7% on \$404,000=	\$28,280
Taxes 2% on \$404,000=	8,080
Depreciation 4% on \$400,000=	16,000
Total annual fixed cost.....	\$52,360

Transmission line:—

5 miles at \$18,000 per mile, \$90,000.
Interest, depreciation and taxes=13%=\$11,700.
Losses, 0.2% for 5 miles=1%=\$22,600.

Annual operating costs \$34,300 for transmission.

Make-up-water:—

Salt water system:—

Boiler feed make-up only (2%)=28 gal. per min.
Cost, \$0.03 per M. gal. plus treatment at \$0.04 per M. gal.= \$0.07 per M. gal., \$950 annual.

Cooling tower system:—

Total make-up (including boiler feed make-up)=100% boiler feed, 1,400 gal. per min.
Cost, \$0.01 per M. gal. plus treatment \$0.04 per M. gal.= \$0.05 per M. gal.= \$33,900 annual.

Comparison— Annual Operating Costs

	Salt Water	Cooling Tower
Cooling System		
Tower-fixed charges.....	\$	\$ 52,520
Pumping	31,000	39,100
Cooling system and condenser maintenance.....	80,000	20,000
Extra steam consumed in Prime Mover.....		71,200
Make-up water	950	33,900
Transmission	34,300	
Totals	\$146,250	\$216,720

Some smaller items have been purposely omitted in order to shorten this report.

The comparison of operating costs indicates that with conditions as stated the load center would have to be about fifteen miles or more from the coast justify the inland location. If, however, condenser maintenance of the salt water system should be double the amount stated, the inland location would be justified at about five miles or more from the coast.

Reliability

The most uncertain factor about the cooling tower system is the wind velocity. The record of weather conditions over a number of years at or close to the proposed location should be studied carefully and proper

allowance made in design to care for such interruptions in cooling as are likely to occur.

In the salt water system the danger of unreliability lies in the necessity for frequent shutdowns for condenser repairs to prevent excessive salt water leakage into the condensate.

Summary

The outstanding advantages of the two systems are:—

Salt water system:—

1. Colder water, higher vacuum.
2. Lower pumping heads.
3. Somewhat more reliable.
4. Lower first cost.

Cooling tower system:—

1. Lower condensate maintenance cost.
2. Locate near load center.

Some Condenser and Cooling Water System Data and Maintenance
Long Beach steam plant of Southern California Edison Company.
Data for seven years, 1916 to 1922 inclusive.

Total generation.....	974,450,000 kw.-hr.
Average annual generation.....	139,207,000 kw.-hr.
Rated capacity of plant.....	47,000 kw.
Units operating time.....	44.7% of total
Load on units while operating.....	75.6% of rated
Total output.....	33.8% of maximum possible

Condenser Maintenance

All tubes Admiralty metal.	
Total tubes in plant.....	18,260
Renewals, total (7 years).....	15,906
Renewals, annual.....	2,272
Tube life, actual	8.04 years
Tube life based on maximum possible use.....	2.72 years

Annual Cost

New tubes, (Less scrap value) at \$4.10.....	\$ 9,316.36
New tube sheets (Less scrap value).....	1,062.35
Labor, repair gang.....	7,317.12
Total	\$17,695.83
Cost per kw.-hr. generated.....	\$ 0.000127

Cooling System Maintenance

Repairs to circulating pumps, annual.....	\$2,600
Repairs to sand pump.....	400
Repairs to screens, jetty, etc.....	1,800
Cleaning intake tunnel.....	1,200
Total	\$6,000
Cost per kw.-hr. generated.....	\$0.000043

Overhead Construction and Operation

By R. R. COWLES*

THE work of the Overhead Systems Committee for this year has been divided among four sub-committees. The reports of these sub-committees are included in the following report. A few items of general interest are noted below.

220-kv. Operation

Since the report of last year's Overhead Systems Committee, the 220-kv. lines of the Pacific Gas and Electric Company have been placed in operation between Pit River and Vacaville. These lines were first raised to full potential in Oct., 1923, and in the latter part of November were placed in actual operation at this voltage and have been operating satisfactorily up to the time of the preparation of this report. The Pit River lines consist of two circuits, of which 60 miles are single circuit flat configuration supported by snow towers as illustrated in Figs. 1 and 2. Of this 60 miles, 28 miles of the conductor is steel core aluminum 1 in. outside diameter, equivalent in conductivity to 325,000 cir. mil copper. The remaining 32 miles is 500,000 cir. mil rope lay stranded copper, as is also the remainder of the circuit from Cottonwood to Vaca. One hundred and forty-two miles of this line in the valley territory is constructed on double circuit steel towers of which Fig.

3 is an illustration. Fig. 4 illustrates two circuit transposition structure.

The insulator string consists of 13 units, nine of which are standard 10-in. suspension type discs. The remaining four consist of two 10-in. special units and two 14-in. special units and at the lower end of the string there is a corona shield 16 in. in diameter. The anchor strings are designed for an ultimate strain of 20,000 lb. One interesting feature of this structure is the fact that less than 4 per cent of the insulator units are in dead end position.

A more detailed report of the Pit River transmission lines and their operation will be presented at the convention in June.

Standardization of Pole Line Material

Through the efforts of the Overhead Systems Committee of the National Electric Light Association considerable progress has been made in the standardization of pole line material, particularly line hardware. The manufacturers have cooperated to a considerable extent in this work and it is to be noted that the number of types and sizes has been very materially reduced. This committee has worked with the national committee towards this end and it is anticipated that considerable saving can be effected by following the standards prepared by the national association.

Regulations Covering Line Construction

General Order 64 has been in effect since July, 1922, and sufficient time has elapsed to make it possible to determine to what extent these rules are workable. No formal changes have been made since this order became effective, although certain rules have been informally modified due to difficulty in complying, and certain devi-

*Overhead Systems Committee: R. R. Cowles, chairman; R. E. Cunningham, H. Mitchener, N. B. Hinson, F. G. Hamilton, L. J. Moore, E. R. Banks, D. D. Smalley, G. M. Bowman, E. A. Quinn, L. J. Corbett, Walter Dreyer, C. E. Young, E. H. Steele, George Hagar, E. R. Northmore, E. C. Taylor, C. B. Judson, R. B. Ayres, C. L. Lawrie, E. D. Sherwin, E. N. D'Oyly, P. O. Crawford, R. S. Daniels, O. G. Steele, W. R. Van Bokkelen, T. W. Snell, E. K. Gwym, F. W. Paul, E. C. Gerrey, C. A. Henize, G. A. MacDonald, M. O. Bolser, R. V. Shields, S. L. Case, R. F. Conlisk, Wm. Winter, M. H. Schnapp, M. S. Barnes, B. G. Hatch, G. E. Honn, H. G. Sharp, W. A. Hillebrand, E. Y. Porter, A. C. Putnam, P. W. Greenleaf.



Figs. 1, 2, 3 and 4.—Showing types of steel towers used by the Pacific Gas and Electric Company.

ations have been permitted in special cases as these have come up. In general it appears that the rules are entirely workable and with certain minor changes will lead to a better type of construction, greater safety to the linemen and still be consistent with economy. Among the difficulties that have been encountered, those which stand out most prominently, are the working space requirements, climbing space, and attachment of guys and grounds to poles. Methods of hanging transformers have been the subject of considerable controversy but this condition is gradually being cleared up. Apparently there is need for some minor revision.

The National Electric Safety Code is now in process of revision, those sections dealing with clearances, climbing space and conductor loadings being given most attention. The California orders have been subjected to very close scrutiny by the national association and much interest has been shown in the practical workings of these orders.

The subject of distribution transformer polarity, after having been the cause of a great deal of discussion in the past years, and after having been apparently settled, has again come up for reconsideration. It was again brought up this year in the National Overhead Systems Committee and referred to the overhead systems committees of the various geographical sections. At the Fresno, Calif., meeting it was unanimously agreed that the Pacific Coast Overhead Committee desired to retain the present standard of additive polarity for all distribution transformers of 200-kva. and below in the lower voltages. Similar action was taken in the Overhead Systems Committee of the National Electric Light Association at the Birmingham, Ala., meeting. It is earnestly hoped that no change will be made in the standards for distribution transformers since the large amount of confusion, which would necessarily result from such a change, would more than offset any possible saving or convenience which the proponents of this change might hope to effect.

Report of Sub-committee on Substitutes for Wood Poles

By L. J. CORBETT*

AT the October meeting of the Overhead Systems Committee, it was decided that the sub-committee should be appointed to make a study of possible substitutes for wood poles. In order to form a basis for substitution, it was decided that the sub-committee should "make a comparison of wood, steel and concrete poles, using factors of safety, spans and loadings which would give comparable results." The matter of the treatment of wood poles above the ground line for protection against white ants was to be a subject for study by the sub-committee, but this has been given very complete treatment in the National Electric Light Association Report of the Overhead Systems Committee of 1922 and 1923.

The rising cost of wood poles and the necessity for replacement due to natural rot and damage from insects make it advisable for the industry to determine without further delay, the status of the wood pole itself and of possible substitutes therefor, in some if not all situations. A total of about 140,000 cedar poles of

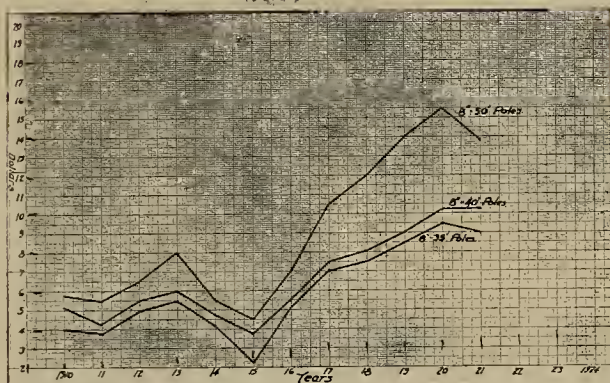


Fig. 1.—Fluctuation in the price of wood poles by years.

greater than thirty ft. in length were used in California in 1923. Over 900,000 cedar poles were cut in the Northwest including Canada, the greater portion of which were shipped to points east of the Mississippi River.

In Oregon and Washington the timber growth is large in size and poles are a by-product of logging operations and often neglected, or at best let out to sub-contractors ahead of the logging. This source is, therefore, closely tied up with logging operations. In the Inland Empire, consisting of eastern Washington and northern Idaho, poles are a more important product, and pole supply companies have their business thoroughly organized, with cruisers out, pole timber bought years ahead, storage yards at shipping points, and some have treating plants. These companies are going farther and farther back into the woods for their poles year by year, with consequent higher costs to get them to the shipping points. Virgin territory still exists in the Clearwater country in Idaho, in Western Montana, in inland British Columbia and along the west coast of Canada. Estimates place the supply as sufficient for from 15 to 20 years with increasing prices. If prices go too high, substitution of southern pine (in eastern markets), full treated fir, Port Orford cedar and other woods will be a regulating factor. Western red cedar, however, is favored by operating companies and will probably be adhered to as long as economically possible.

The curves (Fig. 1) showing the average pole prices at Sand Point, Idaho, indicate the price trend without reference to freight charges. Prior to 1915 the eastern demand was not so heavy as it is now, labor was cheaper and more efficient, and sources of supply were closer to the railroads than at present. It is believed

the price level will not increase so rapidly in the next few years as it has since 1915.

Butt treatment of poles is becoming more popular as prices advance, about 90 per cent of poles now used being butt treated as against only 60 per cent in 1914. Two of the power companies are now trying out orders of fully creosoted fir poles.

Possible Substitutes for Wood Poles

The possible substitutes for wood poles are not many. The committee has gathered data upon concrete poles, tubular steel poles and structural steel poles as complete substitutes, and concrete stubs as partial substitutes to which wood poles may be attached above the ground line. The structural steel pole offered the greatest possibilities, and formed the subject of most of the committee's work.

Present Status

Concrete Poles. These have met with some measure of success in street lighting and for trolley poles, all in



Steel river crossing mast 155 ft. high. The insert at the left shows method of attaching guy wires and the one at the right, method of anchoring.

*Sub-Committee on Substitutes for Wood Poles: L. J. Corbett, chairman; K. B. Ayres, R. E. Cunningham, H. S. Daniels, E. H. Steele, C. E. Young, C. E. Mardell, J. S. Moulton, E. Y. Porter, W. Dreyer, C. B. Carlson, H. G. Sharp.



Types of steel poles used by California companies. Top (left to right), Southern Sierras steel pole, erected; steel footing on same type of pole; Western States Gas & Electric Company pole. Bottom (left to right), pole on Riverside line of Southern Sierras Power Company; latticed pole, used by Southern Pacific Company, Oakland; pole used by Turlock Irrigation District.

cities or parks, but the extreme weight and consequent transportation expense of sizes necessary for the loadings of suburban lines, renders them impracticable for the general use contemplated by the committee. Concrete poles are also used in substation yards by operating companies, but these are generally few in number, of special design and therefore costly.

In 1914 the City of San Francisco contracted for 94 concrete poles for the Church Street railway extension at \$52 each. The bids ranged from \$30 to \$95 each. Prices at the present time will be about double the 1914 prices. The Van Ness Avenue poles cost about \$135 each in place with ornamental top and base.

Concrete poles erected in substation yards of the Pacific Gas and Electric Company have cost \$144 each for 18 poles, at Claremont, in 1922, to \$175 each for three poles, at Knights Landing. These are the direct construction costs.

Tubular Steel Poles. These are also used in special locations and as trolley poles. They must be set in concrete, and be galvanized or painted.

Bates Expanded Metal Poles. These are in use to some extent in the East and to a limited extent in California. Guys must be installed at frequent intervals.

Structural Steel Poles. These have been used to a considerable extent by operating companies and by railroad companies for special uses, but special designs are the order for the varied requirements. This means expense of design, delay in fabrication, and uncertainty of the product or repeated tests. Among the types of steel pole used in California are the following:

The Southern Sierras Power Company used a 40-ft. steel pole, 2 ft. square, weighing 820 lb. including a pipe cross-arm at the top for flat construction, 33 kv. It has a special tapered footing designed for setting in earth without concrete. These poles are used on 300 ft. spans. They are designed for a test load on the top of 2,000 lb. and a torsional load at the end of the cross-arm of 1,000 lb.

The Turlock Irrigation District uses a steel pole 3 ft. 6 in. square at the base, 1 ft. 9 in. square at the top and 60 ft. high carrying two 1/0 stranded copper circuits with suspension insulators for 66,000 volts. Spans vary from 500 ft. to 700 ft. The weight is 2,300 lb. including cross-arms and footing material for a concrete setting. A similar pole is being made for the Western States Gas & Electric Company but with an earth footing. The latter pole weighs 2,500 lb.

The Great Western Power Company has had successful experience for a number of years with a 60 ft. steel pole weighing 1,976 lb. on concrete footings, on its line feeding Richmond. The company has "repeated" by using a somewhat similar pole 52 ft. high weighing 2,000 lb., also set in concrete, to supply the filtration plant in Sacramento. The pole is designed for two circuits of 1/0 copper and to withstand two broken wires.

The Pacific Gas and Electric Company has used structural steel guyed masts to replace wood over some navigable sloughs; costs comparing very favorably with those for wood. There were erected near Marysville quite recently six 100-ft. and two 155-ft. high, at a field cost averaging approximately \$656 for the 100-ft. and \$1,010 for the 155-ft. masts. These figures may be compared with recent costs of wood masts, four 140-ft. masts, in January 1920, averaging \$526 each, and one 185-ft. wood mast, in September 1921, costing \$1,964.

Shipment is best made on steel poles by assembling the opposite faces, the other members and cross-arms being shipped loose, but marked for ready assembly in the field.

Among the advantages to be gained by having standard steel poles for certain loadings are the following:

- Saving in cost due to eventual elimination of the design charge.
- Saving in cost due to quantity production.
- Ability to procure from stock or on quick orders.
- Constancy in characteristics of all poles of a given class.
- Life and maintenance of original strength.
- Freedom from attack of termites and birds.

As the first step in the sub-committee's work, an outline of the important features was made and submitted for discussion at the Los Angeles meeting in December, 1923. Nothing definite came of this discussion owing to the great variety of opinions as to just what loading a steel pole should be designed to withstand. It was the general opinion that a steel pole, through serving as a substitute for a wood pole, should be designed to withstand heavier loading. In addition, it was felt, that, in general, the field of use for the steel pole was not in the distribution network of congested communities, but only in long span construction such as transmission lines and rural distribution lines.

The size of conductor in use on 60-kv. lines usually varies from 1/0 to 4/0 copper, or equivalent in aluminum. The insulators are of either the pin or suspension type. With the suspension type, (assuming 5 units and 400-ft. spans), the load which the pole must actually resist in the event of a broken wire, is reduced to about 60 per cent of the maximum stress in the wire, owing to the insulator swinging into and becoming a part of the catenary. For 4/0 copper with a maximum stress of about 20,000 lb. per sq. in. or 3,340 lb. per wire, this reduced stress becomes 2,000 lb. With the pin type insulator, there is no similar relief except through the bending of either the pin or the cross-arm, or from the wires slipping in the ties. Some tests were made at the bureau of tests of the Pacific Gas and Electric Company to determine the load at which slippage through the ties occurs. The complete record of these tests follows. The first group of tests was made expressly to determine the point at which slippage would occur on 60-kv. insulators using standard tie construction. The second group was made to determine the slippage of weatherproof and bare wire as used on 11-kv. construction. It will be noted that for bare wire the ties will usually slip at about 1,000 lb., although there is no positive guarantee that slippage will occur.

A. Tests on 60-kv. Insulator Ties

Test No. 1. 71,000 cir. mil cable and No. 6 soft drawn tie wire. No tension in cable while tie was made. Ties made loose without using pliers.

Pull

175 lb.	Cable pulled through wire.
560 lb.	Cable pulled through wire.
550 lb.	Cable pulled through wire.
230 lb.	Tie wire slipped over insulator—Final pull 340 lb.
270 lb.	Tie wire slipped over insulator—Final pull 530 lb.
460 lb.	Cross-arm split.

Test No. 2. No. 1/0 standard cable and No. 6 soft drawn tie wire. Loose standard ties made without pliers; 680 lb. applied to cable while making ties.

Additional pull required for slipping of wire, 320, 357, 205 and 270 lb.—Average 285 lb.

Test No. 3. No. 1/0 standard cable and No. 6 soft drawn tie wire. Loose standard ties made without pliers; 375 lb. applied to cable while making ties.

Additional pull required to cause slipping, 300, 110, 110 lb. Average 170 lb.

B. Strain Test on 11-kv. Insulator Ties

Three different sizes of wire, No. 4/0 medium hard drawn weather proof, No. 6 medium hard drawn (bare) and No. 4 medium hard drawn (bare) were used as the conductors with several sizes of wire as the tie wire.

Two methods of tying the tie wire were used, one called the "cross tie," and the other called the "standard tie." A special pin was machined from cold rolled steel for testing purposes to avoid breaking wooden pins. A lead thread cast on the end was compressed when a pull of 1,600 lb. was reached. Babbitt metal was used without any compression up to 2,400 lb. pull on the insulator. All ties were made with pliers by linemen from the San Francisco distribution department in the manner ordinarily found in line work on 11-kv. lines.

Test No. 1.

Conductor—No. 4/0 medium hard drawn weather proof.
Tie wire—No. 4 medium hard drawn weather proof (not annealed).

Test	Standard Tie	Cross Tie lb.
A	375 lb.	450 lb.
B	650 lb.	450 lb.
C	400 lb.	Wood pin broke.
D	300 lb.	615 lb.
E	550 lb.	Wood pin broke.
F	625 lb.	650 lb.
Average	483 lb.	380 lb.
		Average 509 lb.

Test No. 2.

Conductor—No. 4/0 medium hard drawn weather proof.

Tie Wire—No. 4 Annealed (bare).

Five tests were made, the pull on the conductors being as high as 2,000 lb., but the conductor would not slip through the ties. One cross-arm split through the center during this test.

Test No. 3.

Conductor—No. 6 medium hard drawn (bare).

Tie wire—No. 6 Annealed (bare).

Conductors at 250 lb. tension when the ties were made.

Cross Tie (Average of 7 or 8 times around conductor).

Test Slip Pull

A	775 lb.	Conductor pulled through tie.
B	825 lb.	Tie wire broke.
C	800 lb.	Conductor pulled through tie.

Average 800 lb.

Test Standard Tie (2 back turns—8 turns of tie wire around conductor).

A	1,050 lb.	Conductor broke
B	925 lb.	Conductor would not slip.
Average	987 lb.	

1 back turn.

C	500 lb.	Conductor slipped through tie.
D	750 lb.	Conductor slipped through tie.
Average	625 lb.	

Test. No. 4.

Conductor—No. 4 medium hard drawn (bare)

Tie Wire—No. 6 Annealed (bare)

Test Cross Tie (8 turns of tie around conductor)

A	1,100 lb.	Conductor would not slip.
B	2,400 lb.	Conductor sheared at dynamometer.
B	Additional tests	Conductor sheared at dynamometer

Test Standard Tie (1 back turn—8 turns of tie wire around conductor.)

C	1,000 lb.	Tie wire broke.
D	2,000 lb.	Conductor sheared at dynamometer.
	Additional tests	Conductor sheared at dynamometer.

Tests on Steel Poles

In order to avoid any unnecessary testing work, the sub-committee next proceeded to assemble all data on recent tests or studies of steel and wood poles. The records of the Pacific Coast Steel Company showed that four tests had been made at their plant and one test had been reported by the Turlock Irrigation District. These tests were as follows:

Tests of Latticed Steel Poles

Test No. 1—Feb. 16, 1921.

Length—70 ft. Cross-arm—4 ft. Width at bottom 18 in.; $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $\frac{3}{16}$ in. legs at bottom— $1\frac{1}{4}$ in. x $\frac{1}{8}$ in. single lacing— $\frac{1}{2}$ in. bolts. The lacing of this pole was rather steep, being about 30 deg. from the vertical. For the test, two legs on one side of the pole were bolted to the tower testing frame, but the other two legs to parallel horizontal angles arranged for the purpose, which deflected under load to such an extent as to raise a question as to some of the conclusions.

The pole was very flexible, the pulling tackle being pulled to two blocks before critical load on cross-arm could be reached. 600 lb. at the end of a 4-ft. cross-arm gave a deflection of 5 ft. 4 in. On release of load, pole returned to within one ft. of original position. Torsion of arm relative to center line of pole at bottom was about one foot. Later a breast pull of 1,200 lb. sheared a bolt at the bottom connection to frame but did not injure the pole itself. These test loads were applied 63 ft. above the foundations.

The weight of this pole exclusive of cross-arms was 1,300 lb.

Test No. 2—Feb. 18, 1922.

Standard S-24 pole. Length 60 ft. Cross-arms 5 ft. 6 in.—made of $1\frac{3}{4}$ in. x $1\frac{3}{4}$ in. x $\frac{1}{8}$ in. angles. Width at bottom 24 in. at top 12 in.; legs $2\frac{1}{4}$ in. x $2\frac{1}{4}$ in. x $\frac{1}{8}$ in.— $2\frac{1}{2}$ in. x $2\frac{1}{2}$ in. x $\frac{1}{8}$ in.— $2\frac{1}{4}$ in. x $2\frac{1}{4}$ in. x $\frac{1}{8}$ in.—stubs $2\frac{1}{4}$ in. x $2\frac{1}{2}$ in. x $\frac{1}{8}$ in. lacing in pole $1\frac{1}{4}$ in. x $1\frac{1}{4}$ in. x $\frac{1}{4}$ in.—single; lacing in stubs $1\frac{1}{2}$ in. x $1\frac{1}{2}$ in. x $\frac{1}{8}$ in.—double. $\frac{1}{16}$ in. rivets. Weight of pole exclusive of cross-arms, 1236 lb.

This pole was set in earth, but the ground was soft and muddy owing to recent rains and newness of backfill. Load was applied at end of top cross-arm 5 ft. 6 in. from center of pole. The cross-arm failed on its compression side at a load of 1,350 lb. A breast pull was then applied to the pole, and was raised to 1,850 lb. when failure occurred in the legs at the ground line. This can be attributed in part to the condition of the ground, which was quite soft. A re-design of this portion of the pole should be made, as failure at this load might have been prevented by having additional steel to take the earth reaction.

Test No. 3—July 14, 1922.

Standard pole S-24. Same pole as test No. 2 but with base section set in concrete. Load was applied at end of 5 ft. 6 in. cross-arm. The loads with the corresponding deflections are as given in the following table:

Dynamometer reading	Deflection	Tangent of Angle of Twist at Cross-arm (approximate)
1,000 lb.	4 $\frac{3}{8}$ in.	4/75
1,500 lb.	9 in.	8/75
1,800 lb.	11 $\frac{3}{4}$ in.	11/75
2,000 lb.	15 $\frac{3}{8}$ in.	15/75
2,250 lb.	Pole failed	

Load applied at end of center cross-arm. Failure by buckling of compression legs above first splice.

Test No. 4—June 21 and 22, 1923.

Southern Sierras Power Company 40-ft. pole, 24 in. square at ground line; 15 in. square at top. Legs 2 in. x 2 in. x $\frac{1}{8}$ in. and 2 in. x 2 in. x $\frac{1}{4}$ in.; lacing 1 $\frac{1}{4}$ in. x 1 $\frac{1}{4}$ in. x $\frac{1}{8}$ in.—one 9 ft.-0 in. pipe cross-arm at top. Torsion test 1,000 lb. at top of insulator pin, 4 ft.-6 in. from center of pole.

The weight of this pole exclusive of cross-arms was 750 lb. The pole was first tested up to test load of 1,000 lb. without horizontal cross-bracing at top, with load increments of 250 lb. Distortion in the square cross-section of the pole occurred, due to absence of cross-bracing. The following day, with cross-bracing in place, pole was tested up to test load of 1,000 lb., with a deflection at end of cross-arm of 15 deg. No failure. Then pole was loaded up to 1,700 lb. at which point failure occurred in the attachments used to join pole to special concrete footing which was not a part of the pole. No failure occurred in the pole itself.

Breast Pull Test. 2,000 lb. at top of pole at center.

A pole with special tapered footing was set in new earth foundation. Loaded in 500 lb. increments, up to test load of 2,000 lb. with no failure. Pole was then loaded up to 2,600 lb. at which point failure occurred in an open hole in leg at ground line. No failure of any kind in the footing.

Test No. 5.

Made by Turlock Irrigation District on 60-ft., 66-kv., two-circuit pole. This pole was designed to take three broken wires, i.e., a test load of 1,420 lb. on each of three cross-arms on one side of the pole, 4 ft. from the center line plus wind on wires and pole. The weight of this pole exclusive of cross-arms was 2,214 lb.

The following is a quotation from a letter of R. W. Shoemaker dated Nov. 24, 1922:

"Might further advise that I tested one of these poles which was erected on a foundation I consider the poorest of the entire lot, first placing a horizontal pull of 3,000 lb. in the center of the pole at the height of the middle cross-arm; the deflection of the

pole was a little over .3 ft. The same load placed at the end of the middle cross-arm did not increase the deflection of the end of the lower cross-arm more than .015 ft. with this torsional load. After relieving the load the pole went back to within .01 ft. of its original position. There was no evidence of cracking of the concrete base, but the base as a whole moved very slightly toward the compression side. The pole did not show the slightest sign of distress, and our figures lead us to believe that it will stand probably 8,000 lb. pull applied to the center of the pole at the middle cross-arm."

In view of the fact that all of these tests had been made simply by increasing the load and measuring deflections until the pole failed, it was felt that a new series of tests was required. Furthermore, no tests of wood poles were found.

Description of New Tests

The new tests were accordingly made on March 10 and 11, 1924, at the testing rack of the Pacific Coast Steel Company, this company and the Pacific Gas and Electric Company cooperating in doing the work.

In all, five poles were tested, two of the poles being wood poles set in earth and three being steel poles. Two of these steel poles were identical, the third was a trifle lighter. One of the heavier poles was set in concrete, the others were set in earth and a special tapered earth footing was used.

These poles were tested by applying loads at the top and measuring the load and deflection at intervals of 100 or 200 lb., as was thought best at the time. After each load was applied and deflection read, the load was released and deflection again read so that the elastic deflection of the pole could be determined.

Deflections at the ground line were also read, as there was considerable movement in the earth and it was thought that these measurements might be helpful. The condition of the ground where the poles were set was not very satisfactory as the ground was wet and spongy, particularly at the top. In backfilling the holes, as much dry material and rocks of various sizes were used as could be found nearby. The use of these rocks was responsible for the failure of the steel footings, as they caused concentrated reactions against the steel angles and produced local deflections, causing the failure of the poles.

The results of these five tests are given in the accompanying tables.

These data were studied rather hastily but the following conclusions from the tests were drawn:

Analysis of Tests with Regard to Strength and Elasticity

A properly seasoned wood pole is almost perfectly elastic within the limits of the ordinary working loads. The two wood poles tested showed about twenty per cent difference in deflections for the same loads. The wood poles deflected approximately two and one-half times as much as the steel poles for the same loads. The two wood poles tested showed considerable variation in ultimate strength (3,500 lb. in one case against 2,800 lb.), although the diameters of the poles where the breaks occurred were practically the same. One had a 9-in. top, the other an 8-in. top.

TEST No. 1

60 ft. Wood pole set 8 ft. in ground.
8 in. top, 15 $\frac{1}{2}$ in. diameter at ground line.
Pole failed 5 ft. 6 in. above ground—diameter 15 $\frac{1}{2}$ in.
Load applied 51 ft. 6 in. above ground.

Load (Lb.)	Deflection at Ground Line (In.)		Deflection of Top of Pole (In.)		Remarks
	Load on	Load Released	Load on	Load Released	
0	0	0	0	0	
100	0	0	0	0	
200	0	0	3 $\frac{1}{2}$	0	
300	0	0	6 $\frac{1}{2}$	0	
400	0	0	9 $\frac{1}{2}$	0	
500	1 $\frac{1}{8}$	0	13 $\frac{1}{4}$	2 $\frac{1}{2}$	
600	1 $\frac{3}{8}$	3 $\frac{3}{4}$	18 $\frac{1}{4}$	4 $\frac{1}{4}$	
700	1 $\frac{5}{8}$	4 $\frac{1}{8}$	23	7	
800	1 $\frac{7}{8}$	4 $\frac{3}{8}$	28 $\frac{3}{4}$	9 $\frac{1}{2}$	
900	1 $\frac{15}{16}$	4 $\frac{15}{16}$	33 $\frac{3}{4}$	11 $\frac{1}{2}$	
1,000	1 $\frac{1}{2}$	4 $\frac{1}{2}$	39 $\frac{1}{2}$	14 $\frac{1}{2}$	
1,100	1 $\frac{1}{2}$	4 $\frac{1}{2}$	46	17	
1,200	1 $\frac{1}{2}$	4 $\frac{1}{2}$	51 $\frac{1}{2}$	17 $\frac{3}{4}$	
1,300	1 $\frac{1}{2}$	4 $\frac{1}{2}$	56 $\frac{1}{2}$	19	
1,400	1 $\frac{1}{2}$	4 $\frac{1}{2}$	61 $\frac{1}{2}$	20 $\frac{3}{4}$	
1,500	1 $\frac{1}{2}$	4 $\frac{1}{2}$	65 $\frac{1}{4}$	21 $\frac{1}{2}$	
1,600	1 $\frac{1}{2}$	4 $\frac{1}{2}$	71 $\frac{1}{2}$	23 $\frac{3}{4}$	
1,700	1 $\frac{1}{2}$	4 $\frac{1}{2}$	77	24 $\frac{1}{2}$	
1,800	2	4 $\frac{1}{2}$	81 $\frac{1}{2}$	27 $\frac{1}{2}$	
1,900	2 $\frac{1}{8}$	4 $\frac{1}{2}$	86 $\frac{1}{4}$	28 $\frac{1}{4}$	
2,000	2 $\frac{1}{2}$	4 $\frac{1}{2}$	92 $\frac{3}{4}$	29	
2,100	2 $\frac{3}{8}$	4 $\frac{1}{2}$	98	66	Load backed off to 1,000 lb.
2,200	2 $\frac{3}{8}$	4 $\frac{1}{2}$	101 $\frac{1}{2}$	71	Load backed off to 1,100 lb.
2,300	2 $\frac{3}{8}$	4 $\frac{1}{2}$	105 $\frac{1}{2}$	73 $\frac{1}{2}$	Load backed off to 1,200 lb.
2,400	3	4 $\frac{1}{2}$	112		
2,500	3 $\frac{1}{8}$	4 $\frac{1}{2}$	116 $\frac{1}{2}$		
2,600	3 $\frac{1}{4}$	4 $\frac{1}{2}$	121		
2,700	3 $\frac{3}{8}$	4 $\frac{1}{2}$	126		
2,800	3 $\frac{3}{4}$	4 $\frac{1}{2}$	132 $\frac{1}{2}$		
2,900	3 $\frac{7}{8}$	4 $\frac{1}{2}$	138		
3,000	4	4 $\frac{1}{2}$	142		
3,100	4 $\frac{1}{4}$	4 $\frac{1}{2}$	149 $\frac{1}{2}$		
3,200	4 $\frac{1}{2}$	4 $\frac{1}{2}$	156 $\frac{1}{2}$		
3,300	4 $\frac{3}{4}$	4 $\frac{1}{2}$	163 $\frac{1}{2}$		
3,400	5	4 $\frac{1}{2}$	172 $\frac{1}{2}$		
3,500	6	4 $\frac{1}{2}$			Pole failed.



Poles under test at plant of Pacific Coast Steel Company, South San Francisco. At the left is a view of the poles before the tests; next shows 2,000 lb. on wood pole; next, 3,000 lb. on wood pole and the last 1,400 lb. on steel pole.

TEST No. 2

60 ft. Steel pole set in earth.
Depth of setting, 7 ft. 6 in.
Weight of pole, 1,190 lb.
Load applied 52 ft. 6 in. above ground.
Dimensions—1 ft. 10 in. sq. at ground line; 15 in. sq. at top.

Load (Lb.)	Deflection at Ground Line (In.)		Deflection of Top of Pole (In.)		Remarks
	Load on	Load Released	Load on	Load Released	
150.....	...	...	...	...
400.....	3 ³ / ₈	1 ¹ / ₈	11	8 ¹ / ₂	
600.....	1 ¹ / ₂	2 ¹ / ₈	21	17	
800.....	1 ¹ / ₂	1 ¹ / ₈	36	28	
1,000.....	2 ¹ / ₈	2	49	39	
1,200.....	2 ³ / ₄	2 ¹ / ₂	65	51	
1,400.....	3 ¹ / ₂	3 ¹ / ₈	84 ¹ / ₂	68	
1,400.....	...	...	...	...	Failed

TABLE D

TEST No. 3

60 ft. Steel pole set in concrete.
Dimensions of pole same as No. 2.
Concrete foundation 2 ft. 8 in. square by 7 ft. 0 in. deep.
Pole failed at connection to stubs on compression side.

Load (Lb.)	Deflection of Ground Line (In.)		Deflection of Top of Pole (In.)		Remarks
	Load on	Load Released	Load on	Load Released	
0.....	
500.....	3	1 ¹ / ₂	
700.....	6 ¹ / ₂	1 ¹ / ₂	
900.....	9 ³ / ₄	1 ¹ / ₂	
1,100.....	13 ¹ / ₂	3	
1,300.....	17 ¹ / ₄	4	
1,500.....	22 ¹ / ₄	6	
1,700.....	26 ¹ / ₂	8	
1,900.....	32	...	Failed

TABLE E

TEST No. 4

60 ft. Steel pole set in earth.
Dimensions same as No. 2 and No. 3. Weight of pole 1,100 lb.

Load (Lh.)	Deflection at Ground Line (In.)		Deflection of Top of Pole (In.)		Remarks
	Load on	Load Released	Load on	Load Released	
0.....	0	0	...	...
400.....	1 ¹ / ₈	1 ¹ / ₈	2	1	
600.....	1 ¹ / ₄	1 ¹ / ₄	22	16 ¹ / ₂	
800.....	2 ¹ / ₄	2 ¹ / ₈	41	31	
1,000.....	3	2 ³ / ₄	56	43	
1,200.....	4 ¹ / ₄	0	76 ¹ / ₂	59	
1,300.....	5 ³ / ₈	...	118	...	Discontinued owing to incipient bending of horizontal angle at ground line.

TABLE F

TEST No. 5
60 ft. Wood pole set 8 ft. in earth.
Tip diameter 9 in.—Butt diameter 15 1/4 in.
Pole failed 6 ft. 6 in. above ground at point having diameter of 15 1/4 in.

Load (Lb.)	Deflection at Ground Line (In.)		Deflection of Top of Pole (In.)		Remarks
	Load on	Load Released	Load on	Load Released	
0	0	0	0	0	
400	1 1/8	1 1/8	9	0	
600	1 1/2	1 1/2	19 1/4	3	
800	7/8	8/8	28	10 1/2	
1,000	1 1/4	7/8	40 1/4	9	
1,200	1 3/4	1 3/4	54 1/2	14	
1,400	2 1/4	2	65 1/2	17 1/4	
1,600	2 3/4	2 1/4	77 1/2	21	
1,800	3 1/8	2 1/2	88	23	
2,000	3 5/8	3	101	35	
2,200	4 1/8	3 1/2	114 1/2	42	
2,400	4 3/4	3 3/4	127 1/2	47	
2,600	5 1/4	4	146	49	
2,800	5 3/4	...	161	...	Failed

The two heavier steel poles tested showed almost exactly the same elastic deflections for the same loads, although one was set in earth and one in concrete. The lighter steel pole showed twenty-five to thirty per cent more deflection.

On the basis of General Order No. 64 of the California Railroad Commission, the steel poles tested were about 1.5 stronger than the stronger of the two wood poles, i.e., they could be used in a line to carry loads 1.5 greater. This is on account of the different safety factor permissible because of the deterioration of wood. The steel pole tested is heavy enough to carry one broken wire with safety. A steel pole may, and the steel pole tested in earth did, give in the earth so that the total deflections were as much as or greater than those for the wood poles, but bending in the steel itself was of course less.

In the above tests of steel poles, failure occurred in the earth footings and not in the poles themselves. This footing should be redesigned and further experiments carried on. It is, of course, easy to build an earth footing heavy enough to stand without question, but in this case an attempt was made to have it as light as possible. However, the above tests were made to study the characteristics of the poles rather than of the footings.

Relative Costs of Wood and Steel Poles

The following table shows approximate relative first cost and annual costs of wood and steel poles for use on 60-kv. lines. It is based on the use of double circuit poles, pin type insulators, and a hole digging machine for digging holes and erecting poles. A life of twenty years is allowed for the butt treated poles, twenty years for insulators and forty years for steel poles.

The "heavy duty pole" is one which has been tentatively designed by the Pacific Gas and Electric Company for a double circuit wood pole line replacement, using 400-ft. spacing of poles. The pole is designed to resist the breakage or slipping through the ties at 1,000 lb. per wire for the three wires of one circuit. This pole has not been used, and it is only included in this report to bring out the fact that if heavier duty is expected of steel poles than of wood poles, steel poles cannot compete on the basis of annual cost alone. Consideration must be given to other factors, such as the greater mechanical stability, freedom from termite attack, etc.

The "light duty pole" used is the type S-24 pole of the Pacific Coast Steel Company modified to take care of the weakness in the footings which developed at the pole test. This pole will have about 50 per cent more strength than a wood pole, when due allowance is made for the difference in safety factors required by General Order 64. This pole, as is evidenced by the table of costs, is on an even basis of annual cost when the spans are increased in the rates shown in the table, namely, 40 per cent for steel poles set in earth and 63 per cent for steel poles set in concrete.

If the length of life of a wood pole is less than twenty years, or the life of a steel pole more than forty years, the ratios above would, of course, be altered. In fact, if the life of a wood pole were only ten years it becomes economical to install steel, pole for pole, without increasing spans.

Report of Sub-Committee on
Aerial Cable Construction
By T. W. SNELL*

THIS sub-committee has endeavored to investigate the relative merits of various types of insulation for overhead conductors and to obtain comparative costs of several types of construction designed to obviate trouble from accidental "grounds" or "shorts" caused by trees in the line. The work of the sub-committee has been done principally by correspondence, augmented by discussions at the committee meetings of the Technical Sections and a few independent experiments.

*Sub-Committee on Aerial Cable Construction: T. W. Snell, chairman.

ESTIMATED RELATIVE CONSTRUCTION COSTS OF TWO CIRCUIT WOOD AND STEEL POLES
NO OVERHEAD INCLUDED

Item	Wood Poles		Light Duty 60-Ft. Steel Poles		Heavy Duty Steel Pole in Concrete
	50 Ft.	60 Ft.	In Earth	In Concrete	
Wood pole (including arms)	\$30.00	\$ 36.00			
Steel pole (including arms)			\$ 87.00	\$ 81.00	\$132.00
Hauling and handling	3.00	3.00	3.00	3.00	3.00
Dipping stub			1.00		
Digging holes	4.00	4.00	4.00	5.00	9.00
Erection and setting	12.00	12.00	12.00	12.00	12.00
Concrete				34.00	45.00
Total cost of pole	\$49.00	\$ 55.00	\$107.00	\$135.00	\$201.00
Insulators for 60-kv. (pin type including hardware at \$7.50 each)	\$45.00	\$ 45.00	\$ 45.00	\$ 45.00	\$ 45.00
Total cost of pole and insulators	\$94.00	\$100.00	\$152.00	\$180.00	\$246.00
Interest at 8%	\$ 7.50	\$ 8.00	\$ 12.20	\$ 14.40	\$ 19.70
Sinking Fund at 5%					
20 years for wood pole (3.03%)	1.50	1.67			
20 years for insulators (3.03%)	1.36	1.36	1.36	1.36	1.36
40 years for steel pole (0.83%)			0.89	1.12	1.67
Annual cost per structure	\$10.36	\$ 11.03	\$ 14.45	\$ 16.88	\$ 22.73
Ratio of spans required for equal annual cost	1.00		1.39	1.63	2.19
Span	260		360	425	570*

*Heavy duty pole on which cost data is based was designed for 400-ft. span and would not give sufficient clearance for 570-ft. span.

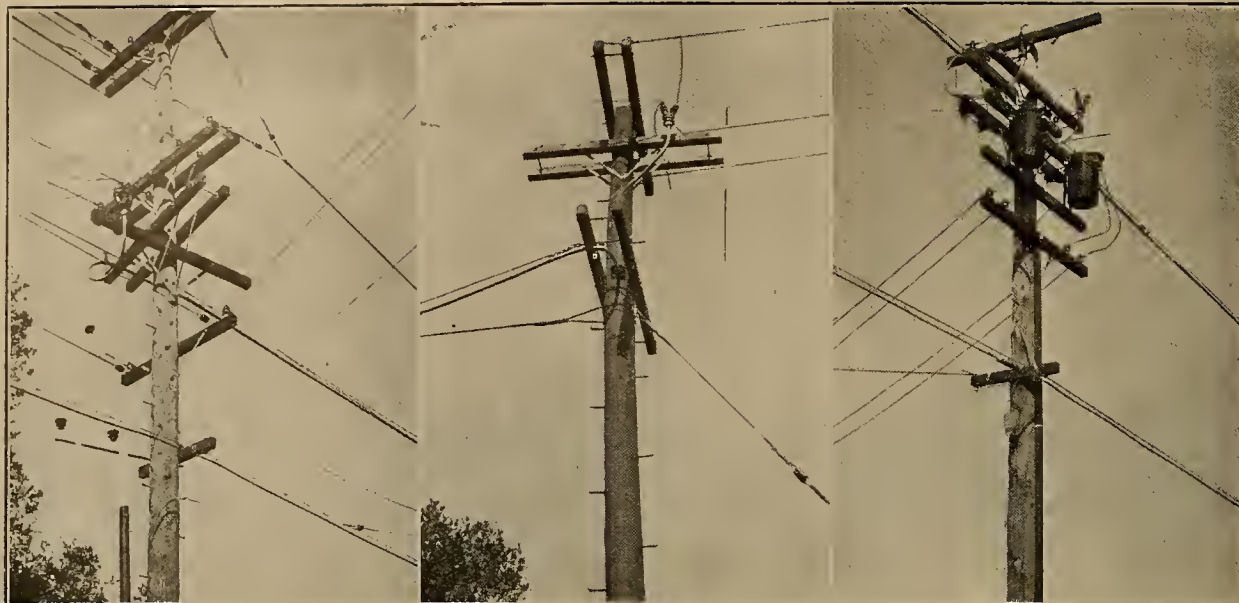


Fig. 1 (left), Fig. 2 (right) and Fig. 3 (center).—Showing from left to right typical dead end of four-conductor cable terminal; cable dead end; and four-conductor cable on 2-phase system with two-conductor cable taken out of splice with connection to two 2,300-volt transformers.

Weatherproof insulation, rubber covering, fabric covering and any combinations of such coverings are subject to damage during installation and to a variable amount of depreciation from age and exposure. For this reason the committee does not intend that any part of this report should be construed as a recommendation for absolute reliance on any such insulations, particularly where human safety is concerned.

Weatherproof Insulation

This type of covering has been generally considered as of very little value except on secondary voltages. When new and undamaged, the insulating value is usually sufficient to withstand at least 2,300 volts. Frequently the insulating value decreases very rapidly and after five or six years is so low in spots that when any appreciable area is subjected to a differential of 2,300 volts a breakdown is almost certain to occur. This is particularly true when moisture is present, as, after the compound is cracked, the only insulating value is the mechanical separation afforded by the layer of compound between the conductor and the object with which it may be in contact.

Several series of tests on old weatherproof wire have been made recently. Samples of wire which had been in service under severe conditions for ten to twenty years have successfully withstood 2,300 volt tests. In samples of other wire which had been in service for a lesser period under the same conditions the insulating value was found to have been entirely destroyed. The results of these tests lead to the conclusion that weatherproof insulation of specifications suitable to the climatic conditions under which the line operates, may retain a considerable part of its insulating qualities for twenty years or more. If this life can be obtained, the cost of weatherproof insulation may be justified in many cases, as a partial protection against "swinging shorts" during storms or during construction and against accidental "grounds" in light trees.

The failure of weatherproof insulation is mechanical. The insulating compound is cracked by abrupt bending, or very sudden changes of temperature; moisture penetrates to the wire through strands of braid which have been insufficiently impregnated; or the insulation may be partially or entirely removed through abrasion or by melting of compound. The wire should be installed carefully, exercising reasonable care to prevent abrupt bending or abrasions when dragging over cross-arms.

Triple braid insulation increases the safety factor by increasing the thickness of the compound and lessening the possibility of surface cracks extending to the conductor. Cotton braid is said to have a longer life than jute and is less liable to absorb moisture as the impregnation is more thorough.

There is a constant tendency for the compound to flow from the upper to the lower side of the wire. It is not necessary for the compound to melt and drip in order to have the flow take place. A very slight softening will cause a gradual bow, which over a period of years will expose the braid on the upper side of the wire. The braid will then disintegrate very rapidly, allowing the insulation to hang in shreds. Various Pacific Coast companies specify that the compound shall not become soft at temperatures ranging from 120 deg. to 130 deg. F. As the temperature of the wire may be considerably higher than the recorded atmospheric temperature, it is possible that a higher softening point would add materially to the life of the insulation.

Weatherproof insulation is worn off very rapidly by abrasion and to protect against this, circular loom has sometimes been placed over wires passing through trees. This adds very little to the weight of the wire, it presents a tough surface for contact with trees and at the same time preserves the insulating qualities of the weatherproofing by protecting it from the elements.

Tree Wire

Wire insulated with rubber, or varnished cambric, or both, covered with circular loom and with an outer cover of weatherproof insulation, has been widely and successfully used on lines up to 4,000 volts, passing through light trees. For higher voltages any type of insulation exposed to the weather has a very doubtful value.

It is sometimes impossible to obtain lateral space through ornamental trees for wires suspended in the usual manner on cross-arms, and there is danger of the wires being broken by large falling branches. To reduce the required lateral space, a three-conductor tree wire has been used, but it has not yet been in service a sufficient length of time to determine its probable life. In order to provide additional mechanical strength, as well as reducing the space required, the several tree wires comprising a circuit, have been bunched together and suspended from a messenger by marlin. In one recent installation the wires have been attached to the messenger with cable rings. With either method of suspension the wires may be fanned out on a cross-arm at each pole so that branch lines or transformers may be readily attached. The permanency of this type of construction under the severe strain of primary voltages and weather exposure has not been determined, but lower-voltage tree wire suspended in this manner for secondary circuits, may materially assist in maintaining service in heavily wooded districts.

Aerial Cable

About twenty-five miles of lead covered aerial power cable for voltages from 2,300 to 11,000 volts is in use in California. Much of this cable has been installed,

where tree wire with open cross-arm construction had been formerly used, and has proved more satisfactory than the tree wire. Large falling limbs are ordinarily deflected with no damage to the cable. In several instances, trees have fallen directly across the cable, breaking the cross-arms on several adjacent poles, but not damaging the cable or interrupting service. Cables have been operated without failure for over fifteen years in a heavily wooded territory, where falling limbs and trees have blown onto the line during every heavy storm.

The cable is installed in the same manner as telephone cable, except for insulation and clearances as provided in General Order No. 64 of the California Railroad Commission.

The cable and supporting messenger must be kept away a minimum distance of 15 in. or 18 in. from the center line of the pole, depending on the voltage. It is recommended that this distance be increased wherever practicable, bearing in mind that this increase of distance adds extra strain to the cross-arm and the bracing must be increased accordingly.

In making a dead-end it is advisable to carry the messenger one span beyond the cable terminal, dead-end on the pole center and attach the messenger to a grounded anchor guy. If this dead-end pole carries supply conductors both the messenger and the anchor guy should be attached not less than 8 ft. below the nearest conductor. When necessary to carry the cable terminal or a tap from the cable to an arm above the messenger, the vertical run should be kept entirely outside of the climbing space, preferably near the outer end of the cross-arms. (See Fig. 1.)

If the messenger or cable is brought within the climbing space or the required distance from pole center (except on dead-ends 8 ft. below conductors) the messenger must be effectively insulated at a point outside of the climbing space and the cable must be insulated with the equivalent in insulating and mechanical strength of $1\frac{1}{2}$ in. of wood. Fig. 2 shows this type of installation in which the vertical run is carried up the pole, enclosed in a protective moulding.

Because of the hazard always present when a ground is maintained within reach of a man working on energized conductors, too much stress cannot be laid on the necessity of protecting such a man from accidental contact with the grounded messenger or cable sheath.

For cables of three No. 2 or smaller conductors, a pole spacing of 140 to 150 ft., using a $\frac{3}{8}$ in. messenger is satisfactory. Larger cables require a closer pole spacing in order to reduce the sag, and maintain a neat appearing line. High-strength, 7/16 in. stranded messenger is sufficient for three conductor 4/0-11,000 volt cables. Any cable suitable for underground work may be used. Both rubber and paper insulated cables are used extensively. The lead sheath of cable should be permanently bonded to the messenger, and the messenger should be permanently grounded.

In 4,000 volt systems a four-conductor cable is often used so that the neutral wire is carried within the cable. An open wire neutral carried on the cross-arm is very satisfactory but it is advisable to place a permanent ground at each end of the tree exposure to prevent an open neutral, in case the conductor is broken by falling trees or limbs. Where a cable is subjected to abrasion by trees, it may be protected by wooden moulding $1\frac{1}{2}$ in. to 2 in. thick. Discarded automobile casings have been used for this purpose. Their light weight is an advantage over wooden moulding.

Potheads should be installed at all probable tap off points, or transfer locations, at the time the cable is installed, as later installations will require a shut down of 6 to 8 hours for each pothead. Three phase potheads are very satisfactory on cables up to 4,000 volts. Fig. 3 shows this. To prevent short circuits by birds or accumulation of wet leaves, three single potheads should be used for higher voltages.

Due to its lower maintenance cost, higher and more reliable insulating qualities and lower susceptibility to failure, the additional cost of lead covered aerial cable over that of tree wire is often justified. Underground construction may be somewhat less liable to failures than aerial cable, but the aerial cable has been so very satisfactory that the underground expense for protection from trees does not seem warranted, particularly in districts where a complete underground system is not desirable in the near future.

Report of Sub-Committee on Line Switches, Fuses and Protective Devices

By R. E. CUNNINGHAM*

THERE have been but few new developments in the past year in line switches or protective devices. There are, however, several types of equipment which it is well to mention for the information of mem-

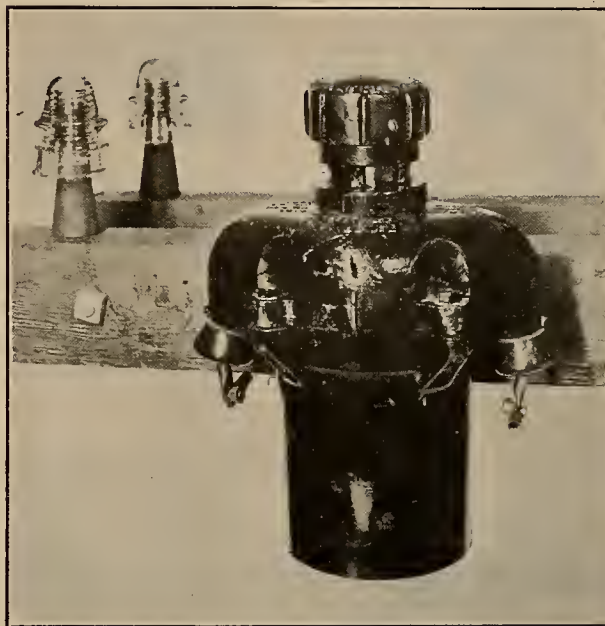


Fig. 1.—D & W oil fuse cutout on overhead line.

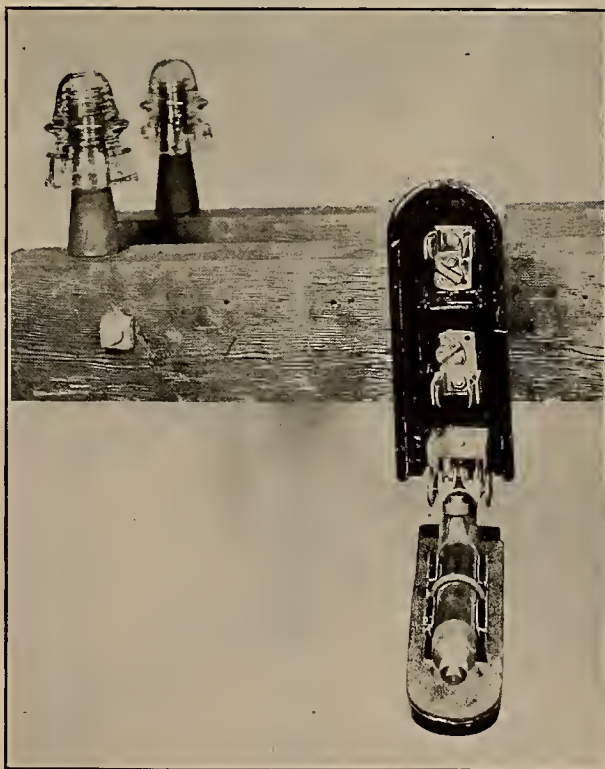


Fig. 2.—Throttle fuse for 2,300 and 4,000-volt lines.

ber companies who as yet have not tried out this apparatus which others have found successful.

Several companies report very successful use of D. & W. oil fuse cutouts on overhead lines where heavy

*Sub-Committee on Line Switches, Fuses and Protective Devices: R. E. Cunningham, chairman.

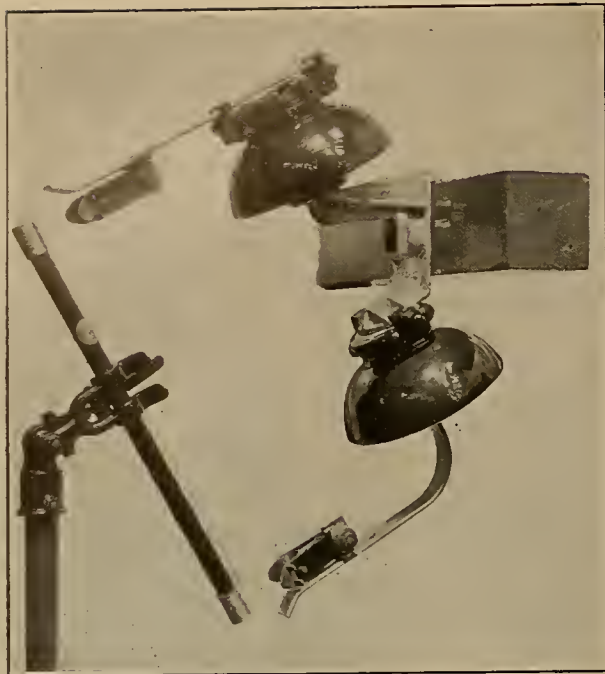


Fig. 3.—Simple fuse mounting for 11-kv. transformer installation.

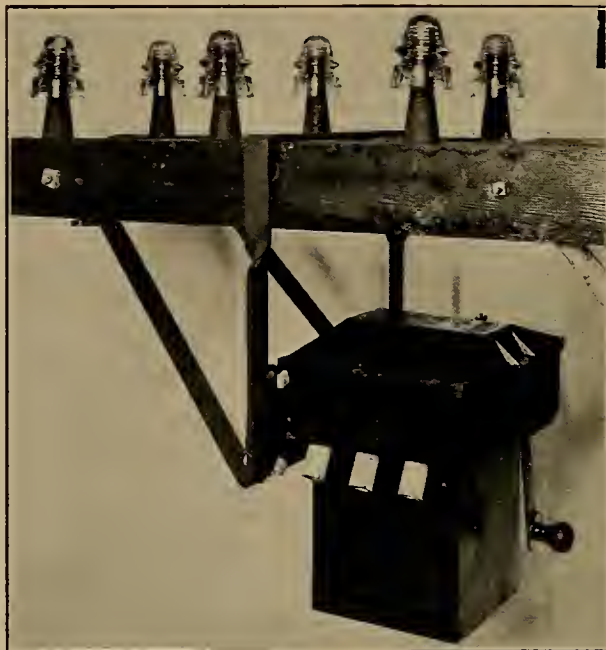


Fig. 5.—Three-pole oil switch for 2,300-volt lines.

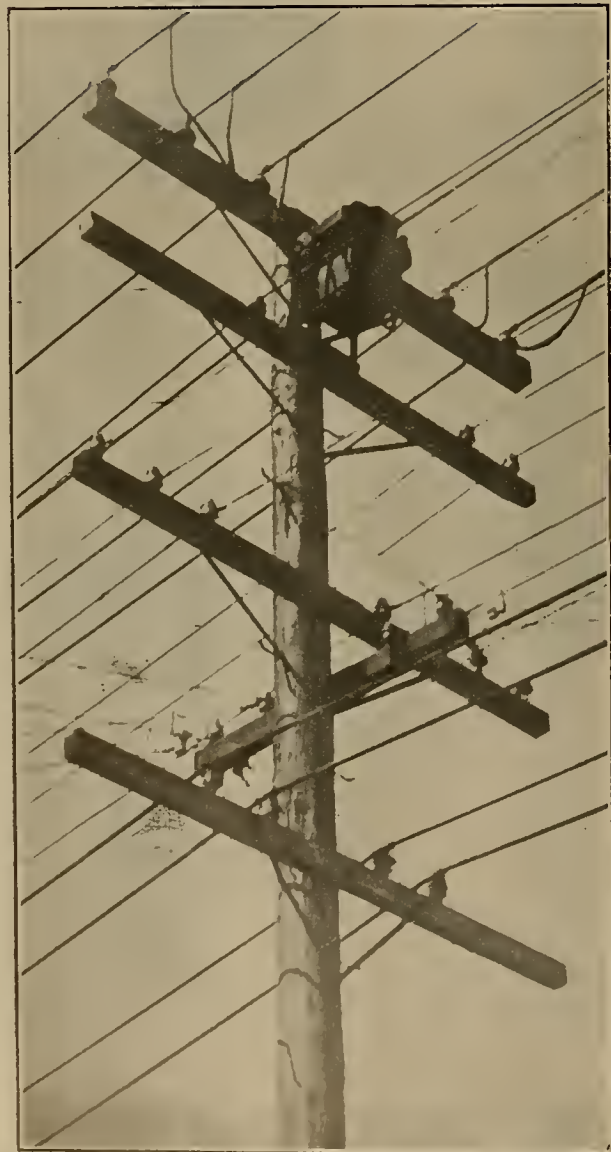


Fig. 4.—T.P.S.T. three-pole oil switch for paralleling 4,000-volt feeders.



Fig. 6.—High voltage three tank switches for junction switching center on transformer installations.

capacity is required. These fuses are already well known as they have had extensive use in the underground and indoor installations. (See Fig. 1.)

The Throttle Fuse is a newer development in the 2,300-4,000 volt class that has been used quite successfully on overhead lines where a greater rupturing capacity is needed than the usual insulator type of fuse block. (See Fig. 2.)

Fig. 3 shows a simple fuse mounting quite extensively used, for 11-kv. transformer installations. The fuses are placed and removed by means of a wooden stick or fuse grabber. Both bakelite and porcelain fuse tubes are used.

Figs. 4 and 5 show the use of three pole oil switches on 2.3-kv. and 4-kv. lines for sectionalizing and paralleling purposes. These switches have been used for some time by several companies and are found to be quite satisfactory.

Fig. 6 shows an installation of high voltage three-

tank switches for a junction switching center and for a transformer installation. These switches are reported to be very satisfactory and to have high rupturing capacity.

There has also been developed a double throw switch for use where double service is desired but conditions will not permit the two circuits to be paralleled.

There have been two new developments in lightning arresters for use on distribution lines: The Pellet type

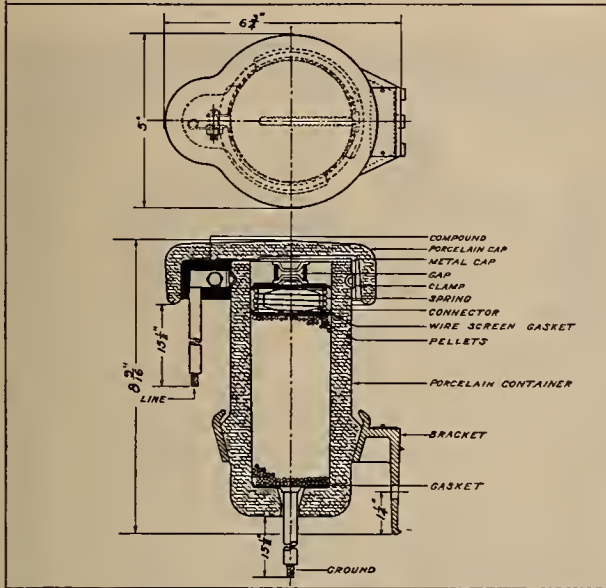


Fig. 7.—Pellet type lightning arrester for 2,300-volt lines.

is an adaption of the well known oxide film arrester. In external appearance it does not differ greatly from the old compression type arrester for 2,300-volt lines. It has a rugged porcelain body supported by a suitable bracket for attaching to cross-arm. In the top of the arrester there is a small gap, the upper electrode being connected with the line wire and the lower electrode in compression contact with the pellets which

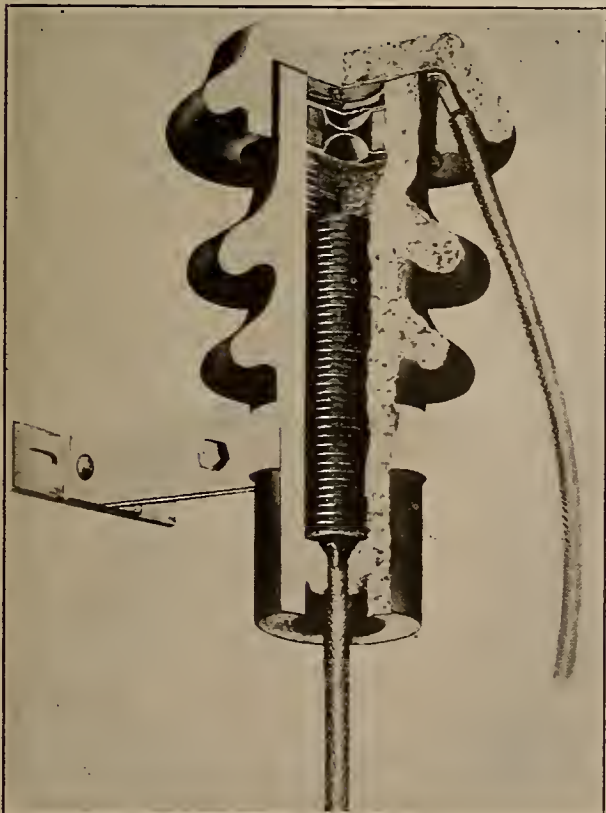


Fig. 8.—Auto valve lightning arrester for 2,300 to 15,000-volt service.

form the path to the ground. These pellets are of lead peroxide coated with insulating powder. The action of the arrester is very similar to the oxide film. This arrester is also made for other voltages up to 15,000 volts. (See Fig. 7.)

Another arrester that has been brought out is the auto valve. This arrester is made up of a series of carborundum discs separated by mica washers with a small sphere gap in the top. This arrester is made for low voltage or neutral arrester and for 2,300 volts up to 15,000-volt service. (See Fig. 8.)

Report of Sub-Committee on 4,000-Volt Overhead Distribution

By N. B. HINSON*

THE tremendous growth of the electrical load in the West, particularly in the small cities and communities of California, during the last five years has been so rapid that it has been difficult to keep up with the demands for electric energy. In certain agricultural and industrial districts, where the distribution voltage is 11 kv. or 16 kv., and the business taken on is in large units, additional feeders have in the past and will in the future be able to take care of the growth, but in a great deal of the territory where the distribution voltage is now 2,300 volts, and the character of the territory, the size of the individual loads, the cost of construction and the right of other utilities operating in the territory, make the use of 11 kv. or 16 kv. out of the question, the problem of taking care of the ever increasing load is a serious one. This latter territory includes practically all the cities and towns and a great many rural sections in which scattered lighting loads and small power loads have been connected to 2,300 volt lines.

In all this territory, the telephone and telegraph companies are in combination with thousands of power company poles and a voltage in excess of 5,000 volts would necessitate separate pole lines which would increase the cost of service and create considerable opposition, due to the presence of two pole lines instead of one. Also, the increased cost of higher voltage transformers for small loads, particularly lighting, would make it practically impossible to take on the many small consumers.

In the rural sections, where the long lines cause excessive drop, additional stations could be constructed, and in the congested city districts where lines are becoming overloaded, additional circuits or heavier copper could be installed. These methods mean the expenditure of large sums of money, and, in the congested districts, the installation of additional circuits means greatly added expense for the new positions, and in some cases, the complete re-arrangement of circuits and stations. This leads to the conclusion that the adoption of a higher voltage than 2,300 volts, which could be carried on the present wires, insulators and pole lines, with the minimum change of equipment, would be the solution of the problem. This leaves only two standard voltages available: 4,400 volts delta, or 4,000 volts star. If 4,400 volts delta is chosen, it would be necessary to change all the transformers on the lines, the station transformers, regulators and all other equipment designed for 2,300 volts. Also, all the old transformers coming in from the lines could not be used again. This would mean an enormous loss, when it is considered how many 2,300-volt transformers there are in service on any particular system.

This leaves the 4,000-volt star connected system as the logical one to use, with the following advantages: The present station transformers can be used, connecting them star on the secondary side, instead of delta; the present line transformers can be used, re-connecting them star on the primary side for power and in the case of lighting transformers, by re-connecting them from one-phase wire to the neutral ground wire. The same wire, insulators, cutouts, and pole top switches can also be used. The station regulators will have to be changed where they are now three-phase 2,300 volts but single phase 2,300-volt regulators can

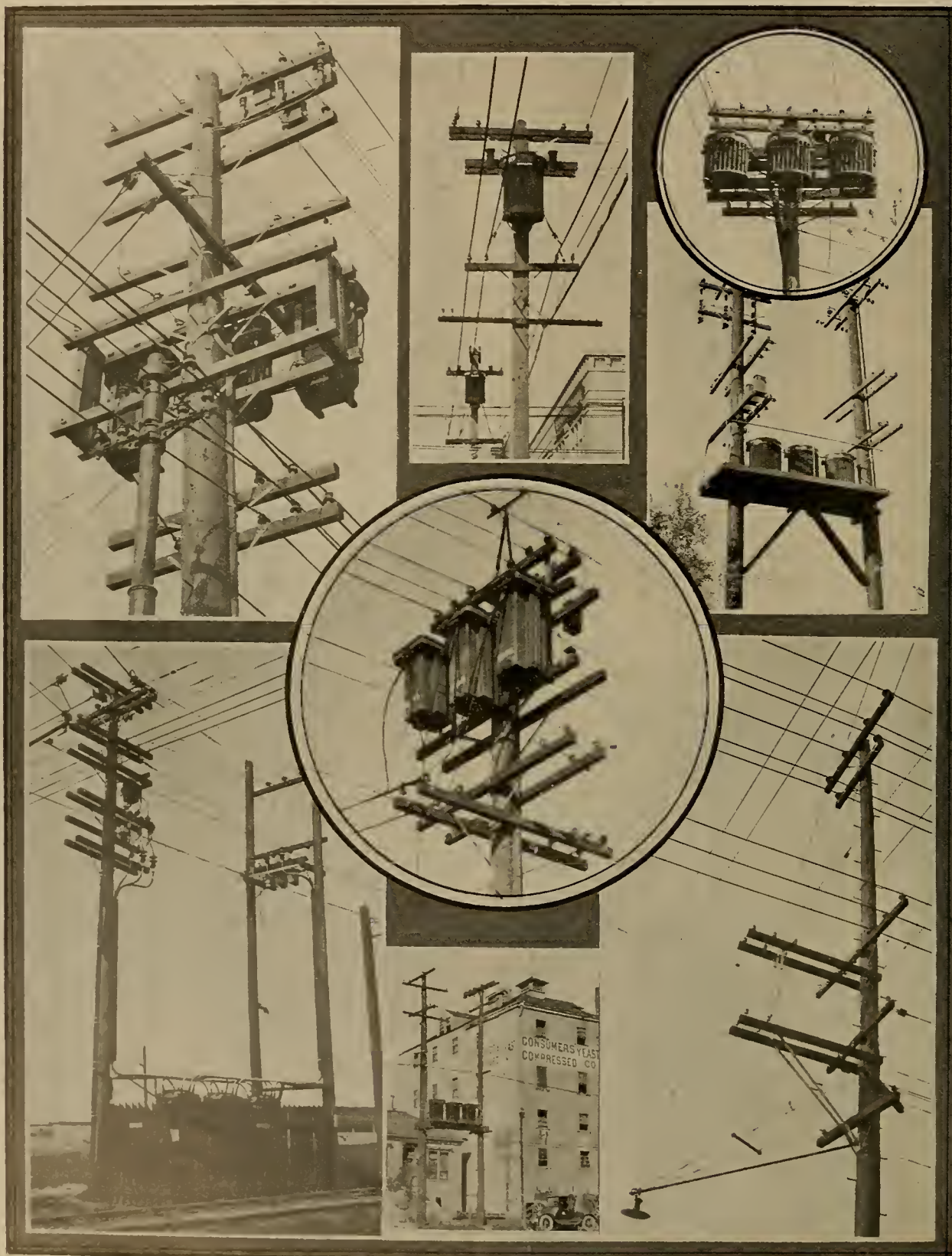
*Sub-Committee on 4,000-volt Overhead Distribution: N. B. Hinson, chairman; C. E. Young, R. B. Ayres, E. Y. Porter, G. M. Bowman, E. R. Northmore.

be used, three to each circuit. It is necessary to make some changes in current transformers, switches, etc., but the expense involved is not very great.

There are several methods of wiring that can be used on such a 4,000 volt system: first, three wire only with the neutral grounded at the station; second, four wire with the neutral grounded at the station only; third, four wire with the neutral grounded at the station and at all the large power banks and at numerous other points along the line. All three systems are in use on the Pacific Coast though the first is used as an

extension of the four wire systems where the lighting load is very scattered and it has been cheaper to use special transformers for lighting rather than carry the neutral wire all the way through. This is not the case in small towns and cities where the lighting predominates. These special lighting transformers have a voltage rating of 4,000 volts to 115-230 volts in place of the standard 2,300 volts to 115-230 volts. These same transformers are also installed open delta for small power loads on the three wire 4,000-volt system.

The advantages of 4,000 volts as against 2,300 volts



Typical 4-kv. transformer installations.

are that in the congested districts where the circuits, switches and other equipment are loaded to their current carrying capacity, the capacity in kva. of the circuit can be increased by 75 per cent without any increase in current, and with this additional load, the per cent of voltage drop to the consumer, will be reduced to 57 per cent of that at 2,300 volts. In the sparsely settled territory where the equipment is not fully loaded in amperes, but the voltage drop is the limiting factor due to the long lines, by changing to 4,000 volts, the load can be increased by 200 per cent with no greater per cent drop, or the lines can be three times as long with the same load and no greater per cent drop, or with no increase in load, the per cent drop will be 33 per cent of that using 2,300 volts. The per cent energy loss with the same load at 4,000 volts, will be reduced to 33 per cent of that at 2,300 volts. The reduction in voltage drop increases the quality of the service, and the decrease in line loss increases the efficiency of the distribution system; two things that all operating companies are continually striving to attain.

A number of the operating companies in California are right now in the midst of a change over from 2,300 volts to 4,000 volts and several others are making plans for the change in the near future. Practically all are following the same general plan, and a brief description of the methods used, the transformer connections and the few points of difference may be of interest and help to other companies contemplating changing over in the near future.

First of all it is necessary to install the fourth wire which is the star neutral and ground wire. It has been thought advisable by some companies to identify this wire all the way throughout the system, and various methods have been used, such as a white insulator to support it, placing the wire in a special location, stenciling on the cross-arm a white "G" under the wire. The two are used on new work and the latter on old work when an old phase wire has been cut to the neutral ground.

The neutral wire is usually one size smaller than the phase wire as three No. 4 with No. 6 neutral, three No. 2 with No. 4 neutral, three No. 2/0 with No. 2 neutral, except when more than one feeder is run on the same pole line, when the neutral is the same size as the feeders, and is common to both. No wire smaller than No. 6 is used as the neutral.

When the old circuit being changed over was a single phase lighting feeder two new wires were pulled in and connected to one of the present wires making three wires of the same polarity. The transformers were then reconnected leaving one terminal of each transformer still connected to one old wire and connecting the other terminals to the other three wires so that the load will be balanced when cut to four-wire 4 kv. When the main cut over was made it was only necessary to change the jumpers at the tie-in point and the system

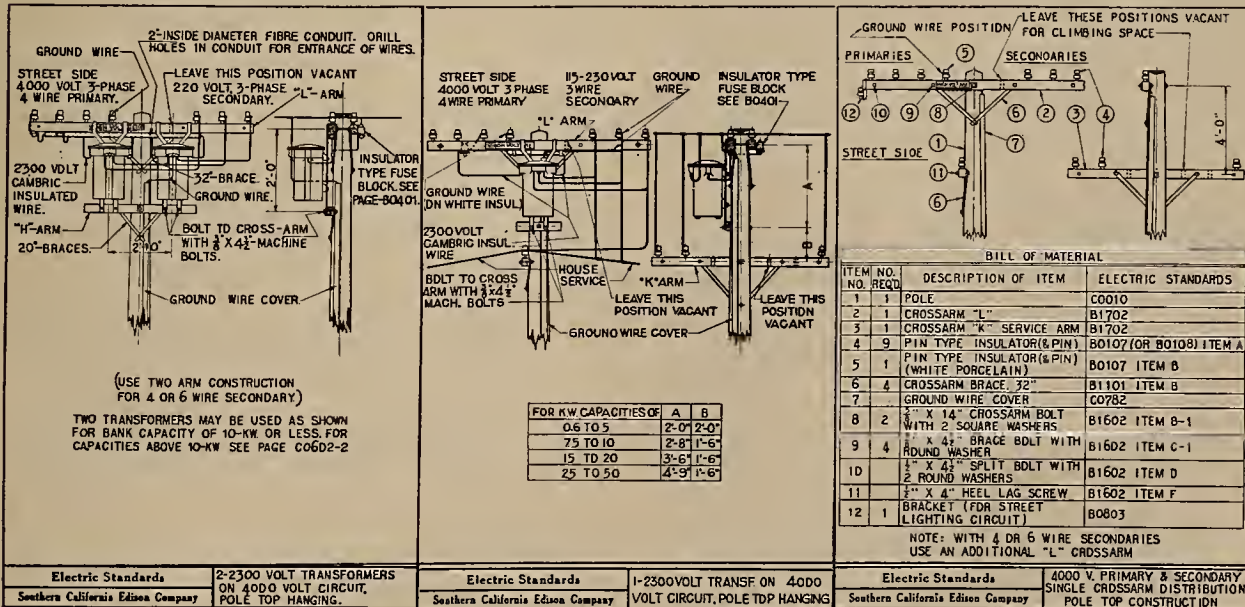
was operating. Some of the Eastern companies only use the four-wire system for the feeders from the station to the center of distribution, running single phase mains from this point. In scattered territory this is not much better than the 2,300 volt system as all the losses in the single phase lines are at 2,300 volts. Most California companies not only have the feeder four-wire but carry this system out on all the main branch circuits so that only the short side taps are on single phase or two phase wires and a neutral.

On three phase power or combined power and lighting circuits the change over is a more difficult undertaking, and requires more of an interruption to service. If the station has two or more banks of transformers and the load is such that during certain periods one bank can carry the load, the other bank can be cut to 4 kv. and one circuit cut over at a time. If there are two stations, one of which can carry the load while the other is changed over, or if an old sub or pole top is to be replaced with a new station, the new station can go on the line at four-kv. The use of one-to-one ratio transformers connected 2,300 volts delta to 4,000 volts star which can be moved from the outer end of the circuit toward the station and from circuit to circuit helps materially in cutting over.

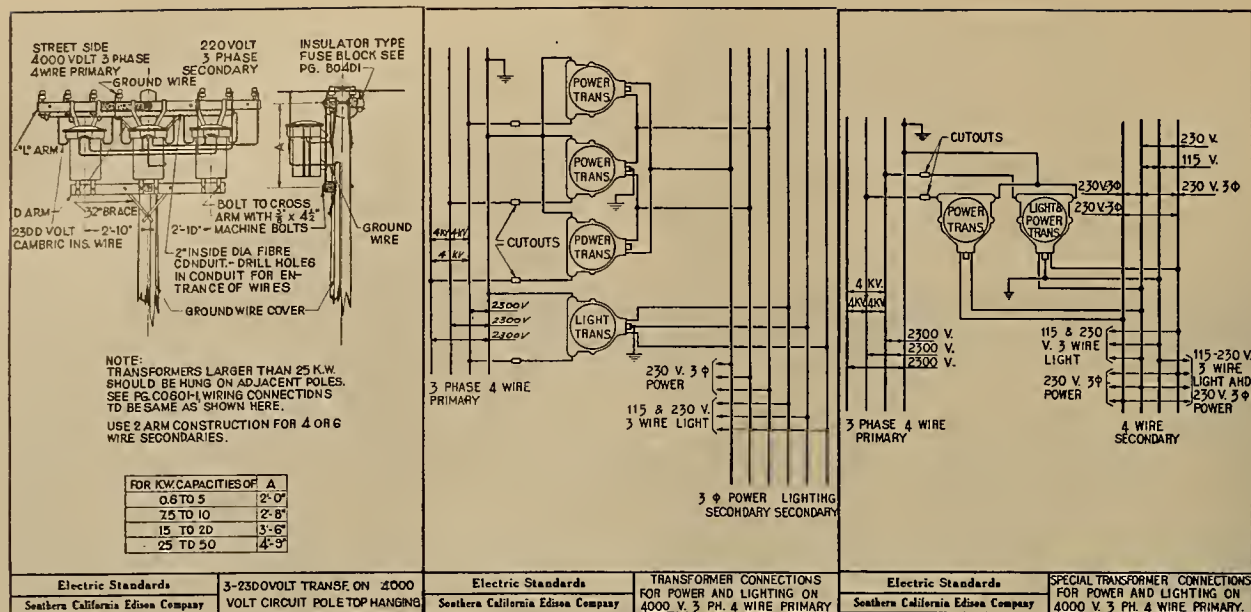
One of the difficulties to be overcome has been the old 2,300-volt motors that could not be cut over or replaced. These have been supplied by the use of three-phase auto transformers 4,000 volts to 2,300 volts.

Three phase 4,000-volt to 230-460-volt transformers have not been used extensively but are coming into use for power purposes in the east and one Pacific Coast company has started to use them in sizes from 10 kva. to 50 kva. The general practice is to use one primary cut out on lighting transformers tying the other side solid to the neutral ground wire. On open delta transformers two cut outs are used, one on each phase wire, tying the common point solid to the neutral ground wire. On open delta connection it is necessary to reverse the connection on one transformer, as compared to open delta connection on 2,300 volts. This can be done on the primary or secondary but if done on the primary it will not be necessary to make any changes in case a third transformer is installed later. Care should be taken to see that open delta loads on a three wire tap line consisting of neutral and two phase-wires are small, as the current in the neutral ground wire is 1.41 times that in either phase wire and the drop is at 2,300 volts between the neutral and each phase wire and the drop between the two phase-wires is at 4,000 volts so that the voltage unbalance may be very bad if the line is long and the load heavy. Some power companies limit the open delta power load on tap lines to 10 kw.

On three-transformer banks and three-phase transformer, three cut-outs are used, one on each phase-wire. Some companies connect the neutral of the three star-



Typical 4,000-volt construction as adopted by the Southern California Edison Company showing method of hanging transformers and single crossarm pole top construction.



Typical 4,000-volt construction of the Southern California Edison Company showing method of mounting and connecting transformers.

connected transformers to the neutral ground wire and ground it at each bank, others do not connect any star-connected banks to the neutral and do not ground the primary neutral wire except at the station.

The same class of insulators, dead-ends, transformer bushings and other line material is used on 4 kv. construction as is used on 2,300 volts except along the coast in the salt fog districts. The general practice is to use ordinary 2,300-volt plug cut-outs up to 25 amp. on 4-kv. lines for protecting transformers except along the coast where lines are exposed to salt fog. Here the cut-outs are mounted on special insulator supports to prevent leakage or special higher voltage cut-outs are used.

For capacities above 25 amp. and in the salt fog districts such cut-outs as Mathews H. Q. and Q. K. West. No. 323795, Line Material 6,600 volts, etc. are used. Fig. 1 illustrates method used by one company to insulate the 2,300 volt plug cut-out from the cross-arm in territory subject to salt fog conditions.

Some companies are using three-phase 4-kv. regulators and others use three single-phase regulators. It has not proved satisfactory to connect the neutral of star-delta banks to the neutral ground wire when single-phase regulators are used. Any current unbalance on one phase of the line causes one regulator to boost the voltage of that phase and this unbalances the voltage between phase-wires and the neutral ground wire and if the neutral of a star-delta bank is connected to the neutral ground wire, currents will flow in the secondary delta due to the action of the bank to hold the voltage to neutral equal on all phases. Some companies ground the neutral wire at the station only and others at all power banks and at intermediate points where lighting transformers only are connected to the line, as well as at the station.

The last three conditions are the debatable ones on the coast, connecting the neutral point of star-connected power banks to the overhead neutral ground wire or not; single-phase versus three-phase regulators, and grounding at the station only or, at a great many places along the line, as well as at the station.

On four-wire 4-kv. systems using three-phase regulators in which the neutral of star-connected banks and the common wire of open-delta banks has been connected to the overhead ground wire, single phase lighting has been taken from the transformers just as it would be on a standard 2,300-volt delta system with the lighting transformer of a size necessary to carry the lighting load plus its share of the power load. On systems in which no connection is made to the overhead neutral wire, open-delta banks cannot be used and if lighting is taken from three-star connected transformers the difference in capacity between the lighting transformers and the power transformers must be small as the primary current from the lighting transformer must flow through the primary of the two power transformers and if they are much smaller they may burn up.

The accompanying drawings illustrate typical 4,000-volt construction as adopted by the Southern California Edison Company, the primary and secondary circuits being placed on opposite ends of the same cross-arms.

Investigation of Demand Meter Troubles

By F. C. GILCREST*

AS was to be expected, the members of this committee reported numerous and serious defects in practically all types of equipment. In nearly every case at least part of the instruments in service were purchased during initial developments. In some instances, owing to the inherent characteristics of the apparatus, the manufacturers now consider a few of the earlier types of indicating devices to be obsolete. Improvements incorporated in the latest product of the manufacturers have eliminated many of the most serious defects so that the application of this equipment may now be made with more satisfactory results than was formerly the case. In spite of the advance which has been made it is still well to remember that demand instruments have not attained to the accuracy or reliability that now obtains in watt-hour meters.

Standardization of Electrical Measuring Instruments

At the annual convention of the American Institute of Electrical Engineers in June, 1923, H. B. Brooks presented a paper on the above subject. Included as a part of this paper was a proposed "American Specifications for Electrical Measuring Instruments." The committee has examined these specifications and has made the following suggestions for changes or additions:

III—Fundamental Definitions.

"A multiplier is a particular type of series resistor." Insert after the word resistor, "or reactor." This insertion is considered necessary to take care of induction type instruments.

"The scale length" to be defined as an arc drawn through the middle of the scale divisions from zero to the end of the scale, instead of the arc described by the end of the pointer. In the latter case, a useless extension of the pointer would give the instrument a greater scale length.

*Meter Bureau: C. F. Gilcrest, chairman; T. E. Knackstedt, W. C. Wells, J. J. Skinner, A. J. Hall, W. G. Knight, D. D. Smalley, W. C. Smith, B. G. Hatch, O. A. Knopp, W. N. Lindblad, G. H. Searle, R. Crowell, W. R. Frampton, A. S. Price, H. R. Thomas, J. C. Albert, W. H. Talbott, T. P. Garrett, F. E. Dellinger, J. M. Morris, J. E. Bridges, G. A. Collins, Lou Johnston, L. A. Nott, J. G. Monahan, R. G. Jones, A. L. Duesbury, R. S. Daniels.

- “(c) The voltage influence.” The plus or minus 10 per cent change from rated voltage will, for instance in the case of a wattmeter, change the indication plus or minus 10 per cent. It is therefore suggested that a reservation be made as— “assuming the numerical value of the quantity measured remains constant.” In the case of a wattmeter the wattage should remain constant.
- “(e) The power factor influence.” A reservation is suggested to prevent overloading the current coil. If a test is made at full scale the current would double. By determining the error at half-scale deflection, this would be avoided.

V—Requirements.

“Dielectric strength tests.” This clause seems to exclude ammeters calibrated with a high voltage current transformer. A thousand volt test would not be high enough to take care of such instruments. It was already specified that “an instrument is defined as a measuring device which may consist of an indicator together with an instrument transformer.”

The committee also gave consideration to a suitable definition for the rating of instrument transformers. A very satisfactory method would be to base the volt-ampere capacity on a definite percentage change in ratio and phase angle for a certain definite change in secondary burden. In this connection it was the unanimous opinion that it would be very desirable to have available a current transformer designed for a secondary burden of two or three volt-amperes whose ratio error would not exceed + or — .5 per cent and the phase angle not to exceed 10 min. between 10 per cent and 100 per cent of the normal primary current.

Kva. Metering

It is the function of the Meter Committee to consider this subject only as it relates to instruments designed for the above purpose and their maintenance. There are several instruments available for measuring kva. and kva-hr. Their descriptions have already appeared in committee reports. In addition to the quantities just mentioned some of these meters also record the kilowatt demand and the kilowatt-hours.

Up to the present time we believe there are no installations in this state where meters are being used to record kilovolt-ampere hours directly. If the rate making authorities decide in favor of a more general application of this type of schedule it will be possible to secure the instruments for this purpose but it is well to bear in mind that the equipment is not of established reliability which is obtained from standard watt-hour meters and will therefore require much closer supervision.

Theft of Current

It is considered inadvisable to discuss the details of this subject for general publication. It is sufficient to state that the manufacturers are cooperating with the utilities to provide installations which will be reasonably secure from unlawful tampering. By introducing slight changes in the meter construction and also by

combining the meter with iron clad service switches the possibility of interference is decidedly reduced. As far as it is possible to secure information we believe that the theft of current is not as prevalent in this section as it is in some other parts of the country.

New Developments in Meter Accessories

For some phases of meter testing work it is required to accurately measure time intervals. One of the members, O. A. Knopp, has devised a pendulum and relay combination for performing this function which operates very satisfactorily. It was reported that the Westinghouse Electric & Manufacturing Company has designed an attachment to be applied to RA demand meters whereby any number of these instruments may be operated in synchronism. The arrangement is such that one clock operates all of the tripping mechanisms. This device requires a pair of connecting wires between all the instruments.

The committee investigated a new type of potential switch, involving a mercury contact, for use with rotating standards. While this scheme possesses some very desirable features it has not as yet proved altogether satisfactory.

Power Measurements on Circuits with Paralleled Current Transformer Secondaries

The committee investigated the accuracy of this method when three circuits were involved. The registration of a totalizing meter was compared with the sum of three individual meters supplied by separate current transformers. Variations of both current and power factor were produced and under all conditions the results were very satisfactory. The maximum error determined was approximately 1 per cent.

Outdoor Metering Equipment

An analysis of the comparative costs of indoor and outdoor types of instrument transformers shows that while the indoor type is the cheapest it may become the more expensive to use if a housing structure has to be built to protect it from the weather. Combination metering units in which both current and potential elements are all contained in one tank cost approximately 75 per cent higher than separate units of the outdoor type when considering the same manufacturer's product. This difference is somewhat overcome by the greater installation cost for the individual units. As between different manufacturers' products there is a wide disparity in prices. In this territory the individual outdoor units have proved the most popular as they have been used in the great majority of cases.

Standard Testing Facilities

The committee finds that some of the members have adopted very satisfactory arrangements for testing consumers' meters of large capacity. The report includes description of two and three wire d.c. installations as well as single and polyphase a.c. installations.

Transformer Cooling

By E. R. STAUFFACHER*

THE subject of cooling of transformers is one which is of considerable interest to the central stations on the Pacific Coast at this time. The comparatively high temperature and the scarcity of a large supply of fresh water, such as lakes or rivers, in the inland valleys has necessitated that special means be devised to successfully cool station transformers. The subject is so important that it was decided to devote a good part of the time of the Apparatus Bureau to this subject.

In general, due to the lack of a large supply of fresh water at the substations it is necessary to adopt means of cooling and re-circulating the water used for

transformer cooling. A spray pond or cooling tower is used for cooling the water and the results are satisfactory from this standpoint. However with the gradual evaporation and the addition of only make-up water to replace that lost by leaks and evaporation the mineral content of the cooling water gradually increases. This accelerates the formation of scale in the water coils in the transformer with the resulting loss in efficiency of heat transfer. To overcome this tendency to excessive scale formation various systems of water softening have been installed and are giving satisfactory service but in the larger sub-stations the maintenance of these systems becomes rather burdensome.

Systems of oil circulation in place of water circulation through the coils as well as systems which circulate the insulating oil directly without the use of coils in the transformer are used with success. The warm oil is cooled by circulation in coils or radiators which are located exterior to the transformer and which are immersed in water or upon which water is sprayed.

The Pacific Gas and Electric Company reports that

*Apparatus Bureau: E. R. Stauffacher, chairman; Roy Martindale, H. H. Cox, C. P. Garman, J. C. Albert, O. W. Wingard, O. G. Steele, Paul Ost, James F. Pollard, T. W. Snell, E. K. Gynn, H. M. Buck, G. E. Armstrong, J. H. Cunningham, Allen Jones, J. A. Koontz, C. F. Benham, G. A. Edley, F. R. Knight, A. J. Hall, E. A. Crellin, B. D. Dexter, H. T. Sutcliffe, S. J. Lisberger, W. H. Talbott, K. P. Ayers, Emery Sherwin, C. E. Schnell, R. C. Denny, H. S. Miner, M. L. Crum, J. L. Thompson, L. J. Moore, W. R. Bartey, R. M. Peabody, F. H. Mayer, J. C. Gaylord, L. L. Dyer, R. H. Halpenny, M. L. Baden, Paul H. Yelton, F. V. Wright, W. P. L'Hommiedieu, R. A. Hopkins, W. A. Copley, J. E. Bridges.

at a sub-station where the cooling water contained a large percentage of chemicals that had a tendency to form scale, a cooling system using distilled water was installed and is working satisfactorily. The distilled water is circulated and is cooled by means of the natural scale-forming water flowing over external radiators. Self-cooled transformers are used to a large extent on the Pacific Coast but the difficulty of moving larger capacity transformers equipped with large radiators offers quite a problem.

A number of reports are submitted covering various phases of the problem of cooling transformers. This subject is one which should be given most thorough study by the manufacturers of transformers for it is felt by the operating companies that better means could be devised to solve this problem.

A New Development of the A.B.O. Type Transformer

The letters "A.B.O." have been designated as the type designation for an oil-insulated transformer cooled by air blast. Heretofore developments on the A.B.O. type have been confined to the application of a comparatively large blower equipment forcing a large volume of air at low pressure along the cooling surfaces by means of shields or deflectors. A reduction of about 50 per cent in the oil rise was obtained by this method of cooling, but the saving in cost as compared with a straight self-cooled unit was small due to the large capacity blower and motor and quite expensive casing required. This small saving in cost precluded the general use of this type of transformer, though a few units were built.

Recently further experiments have been made to determine the minimum amount of air required to obtain the same result—i.e., a 50 per cent reduction in oil rise. Tests show conclusively that it is necessary to apply only a small volume of air in the form of small jets to the radiating surface and at moderate pressure. Only enough air is required to break up the air film on the radiating surface and set this air in circulation. By this new method the same reduction in oil rise is obtained at much lower cost due to the small blower and motor required combined with a simple design of air deflector.

The air piping is so arranged as to direct small jets of air on the radiators at advantageous positions, to increase the cooling efficiency.

Estimates indicate that the A.B.O. type transformer price will be approximately half-way between the standard water-cooled and the standard self-cooled types as shown in the following tabulation:

Kva.	W.C.	A.B.O.	H.
2,500 to 10,000	100 per cent	125 to 130 per cent	150 to 160 per cent

These percentages include the cost of the blower equipment, and are for either indoor or outdoor service. The saving for this type increases with the increase in capacity. Efficiencies will be approximately the same as water-cooled efficiencies. Another important feature of the development is that the radiators may be detached from the transformer tank and all placed in a nest by themselves. The radiators for two or three banks of transformers may thus be installed in a single unit so that the oil circulation may be maintained in all the transformers continuously.

Application and Advantages

1—The A.B.O. type will be applicable for installations where water is not available, not suitable or expensive.

2—This type may also be used instead of a straight self-cooled transformer where the ambient temperature may be above 40 deg. C.

3—It is applicable to locations where there is a great variation in load. Since the tank is provided with a large radiating surface, there always will be a self-cooled rating of 40 to 50 per cent of normal kva., with the blower shut off.

4—Another important feature is that a spare transformer or a spare bank of transformers may be connected into the cooling system so as to be available for instant service.

5—Repairs can be made readily.

6—Cooling system may be independent of the transformer tank. This may be important where floor space is limited. If desired the transformer may be located indoors and the cooling system outdoors.

7—The tank may be designated to fit the core and coils and may be made much shorter than would be used normally.

Although no transformers of this new type have been placed in service, the manufacturers are satisfied with the tests made and will soon be in a position to place them on the market.

Description of Natural Cooled, Oil-Circulated Transformer Cooling System Located in Long Beach, Calif., and Designated as Pine Avenue Sub-Station, Southern California Edison Company

This installation of transformers, is of the outdoor natural cooled type, being 3 units of 2,000 kva. each. The installation of the second bank having a similar capacity is now in progress.

The substation site was approximately 25 ft. x 52 ft. and in order to accommodate the present and future needs, a three-story and basement concrete building was erected. The transformers are located in the basement and in order to have better air circulation and consume less floor space, the radiators were removed from the transformers and placed in a structural steel rack located on the roof. The present and future racks were designed for 2 banks of 18 radiators each, located in a suitable position to utilize the sea breezes for cooling.

The following is a description of the various units and system employed to circulate the oil from the transformers to the radiators.

The oil is taken from a point located on the upper part of the transformer shell (thereby getting the hottest oil in the case) through a common 2½ in. suction line to a vertical Byron Jackson 2 in. x 11 in. centrifugal 60-gal. per. min. pump direct connected to a 5-hp. induction motor and delivered against a head of 74 ft. through a 2½ in. pipe to a common header connected to the bottom of the radiators. The oil then circulates through the radiators and through a top header passing into a storage tank located on the roof. This tank has gauge glasses, 2½ in. overflow and breather connections. Note that there is only one breather connection for the whole system. The oil then passes from the roof tank through a 2½ in. pipe line and a system of float valves to a 2-compartment equalizing tank in the basement whereby the oil in the upper compartment is automatically maintained at a constant level. This arrangement is used to reduce the pressure on the line from the roof to the equalizing tank so there will be no pressure on this tank. The 5-in. equalizing line is connected from the equalizing tank to the transformers and is designed to replace the oil as fast as it is withdrawn by the pump. The oil level in the transformer conservator tank drops 5 in. when the pump is in operation. This 5-in. drop is required to get the gravity flow from the equalizing tank to the transformers. The lower compartment is used as an overflow tank and only a few inches rise in the equalizer tank will ring a bell and overflow into the lower compartment where it can be picked up and recirculated in the system.

The outstanding feature of this pipe hookup is, there is no pressure on the transformers more than the normal filling. This system has been in operation for the last six months and to date has been very successful.

Transformer Cooling—Bureau of Power and Light, City of Los Angeles

The Bureau recently installed a Braun cooling tower at its substation No. 1, in connection with an enlargement of the station. This tower at the present time is considerably underloaded. It is evaporating about 0.8 per cent and the Bureau is highly pleased with its operation. This station formerly used untreated city water, and considerable trouble was had with scale. A water softener was later installed, claims being made that the softened water would gradually dissolve the scale in the pipes. (Coils had been cleaned with acid.) These claims were disproved when some of the old piping was torn down, as it was found very badly encrusted with scale.

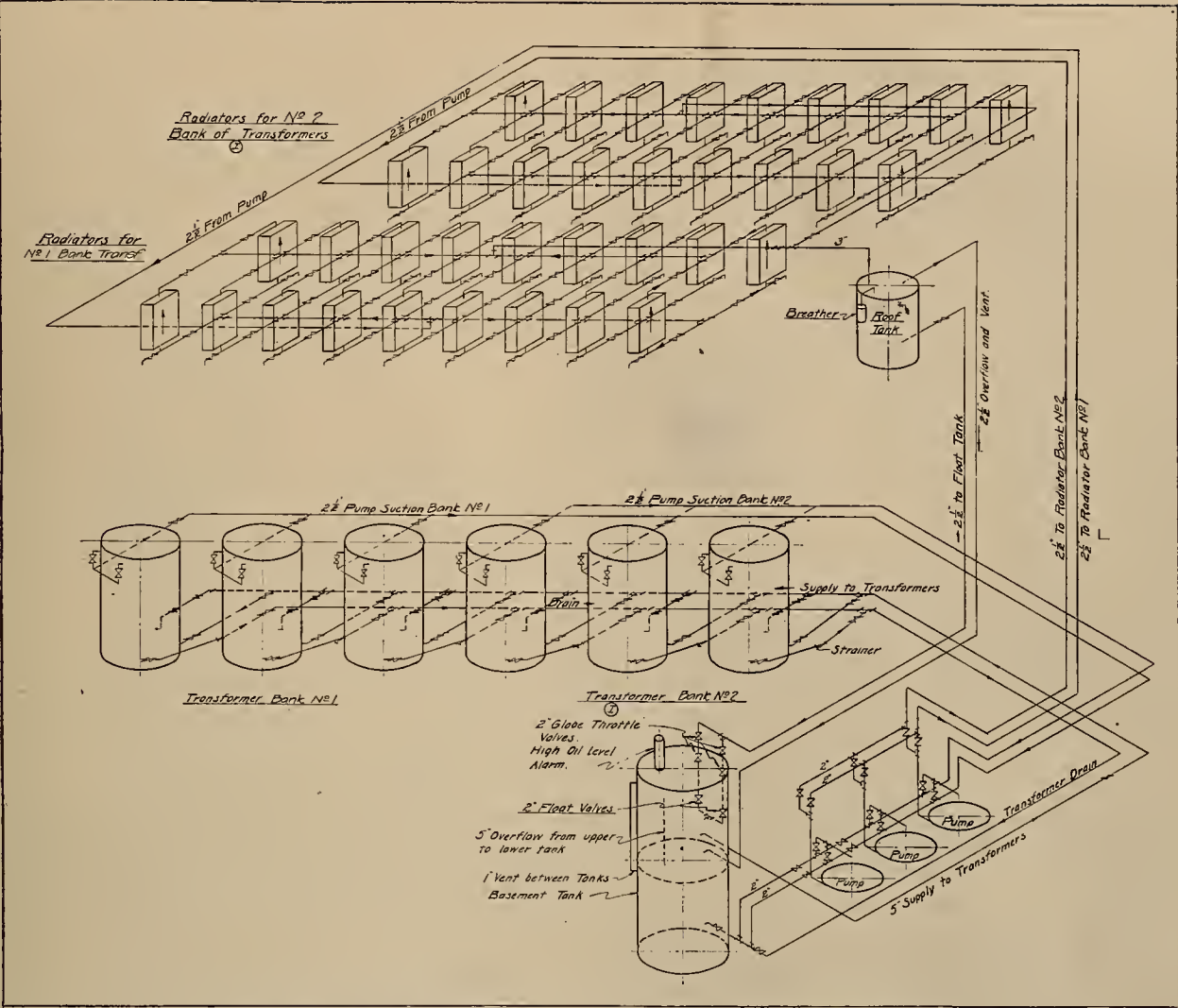
In the design of the piping and pumping layout for the above-mentioned enlargement, particular attention was paid to having piping large enough to allow for the scaling up and rusting up of the piping in service. Allowance of from 50 per cent to 80 per cent in excess of the theoretical, carrying capacity of piping, was made to cover this point.

Tests made on a number of representative transformers gave the following results:

Velocity of flow through cooling coils
New transformers, 275 ft. per min.
Old transformers, 200 ft. per min.

The old transformers tested were some in which the coils had been recently cleaned with acid. The conclusion drawn from the above, therefore, is that much of the difference in velocity is due to increased friction caused by roughening of the coil surface by corrosion.

The installation of standard water meters on some transformer cooling coils as flow indicators is being considered—using them, possibly, as both indicating and integrating meters. The test dial on standard meters of smaller sizes is one cubic foot per revolution, which, even on small cooling coils, would run at a fair speed for indicating purposes. The use of the integrating



Transformer oil piping at Pine Ave. Substation, Southern California Edison Company.

feature above suggested, would be for the purpose of making studies over a period of time to determine the amount of decrease in flow due to scaling or rusting. If desired, the register train could be removed and a large hand attached directly to the meter shaft thus giving a higher speed to the indicating pointer.

This Bureau has been using standard water meters for several years as flow indicators in the oil and water lines to vertical generator thrust bearings, with excellent results. No trouble is anticipated in using them on transformers, provided the cooling tower is kept free from moss.

The cost of the meters is, approximately, as follows:

3/4 in.	\$13.00
1 in.	19.00
1 1/2 in.	36.00

Experiments on Cooling Transformer Oil in Automobile Type Radiators

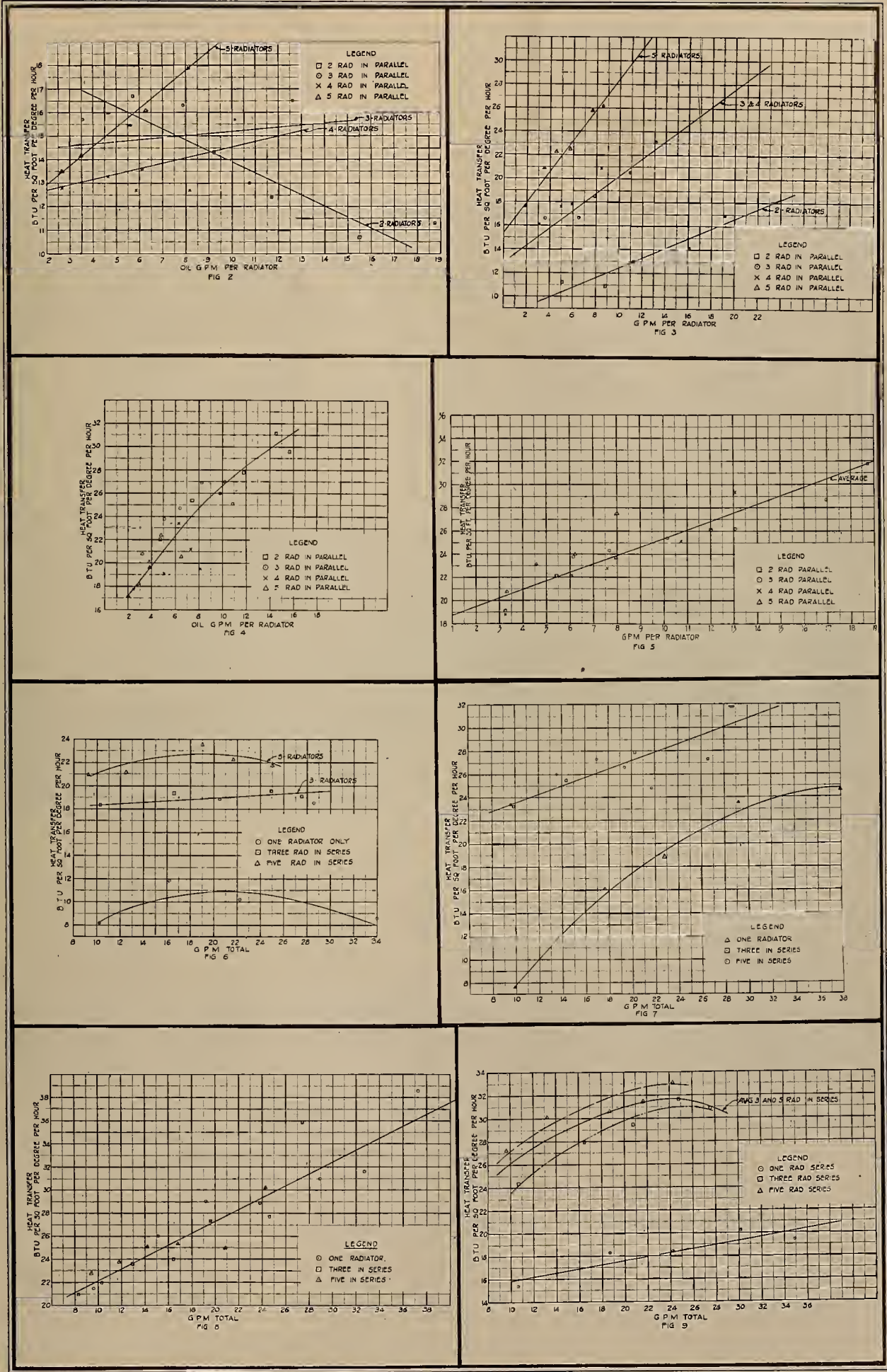
During July and August, 1923, the engineering department of the Southern California Edison Company conducted some tests on a small scale to determine the efficiency of an automobile type radiator in cooling transformer oil. The reason for undertaking these tests was to find a means of cooling transformers which would be low in first cost, economical in operation and would do away with the trouble frequently encountered in water-cooled installations. Except at the hydraulic plants, there is rarely a supply of water sufficient to use without re-circulating through a cooling tower, and the water is frequently of such hardness that it is necessary to install water softening apparatus to prevent scale deposits in the transformer cooling coils. For transformer installations of 12,000 kva. and upward, the water softening apparatus is quite expensive and

requires considerable attention to operate properly. Other difficulties with water-cooled systems are the necessity for frequently renewing the water in the cooling system due to the concentration caused by continual evaporation, and also frequent cleaning of the cooling tower. The self-cooled transformers in the larger sizes (3,000 kva. and up) are quite expensive in first cost.

The general layout of the apparatus used in the tests is shown in Fig. 1. The oil was heated by passing it through two 5,000 watt Everhot heaters. The temperatures were measured by calibrated thermometers in thermometer wells at the inlets and outlets of the radiators. The oil was circulated by a centrifugal pump and the flow measured volumetrically in a tank. Air was blown through the radiators by a Buffalo Forge Company blower and the air velocity measured by a pitot tube connected to an Ellison draft gauge. The temperature of the air entering and leaving the radiators was recorded. The heat balance between the oil and the air was calculated for each test and if the balance was not reasonably close the test was re-run.

The radiators were arranged in a battery of five and the connection so valved that oil could be run through one or more radiators in parallel or in series at various velocities. By varying the speed of the blower, tests were made at several different air velocities.

The radiators used were made by the Bowerbank Radiator Company of Los Angeles, shown in Fig. 1. These radiators offer a direct passage for the oil and air and present a large cooling surface. Each radiator was nine inches square and four inches deep in the direction of the air flow. The cooling surface in each radiator, counting the area of metal in contact with the oil, is 12 1/2 sq. ft. Tests were made with oil velocities in the radiators varying from 0.05 ft. to 1.00 ft. per



Figs. 2-9.--Showing rate of heat transfer in tests of automobile type radiators for cooling transformer oil.

covered the subject so thoroughly that it was felt that little could be added to it by the Apparatus Bureau of the Pacific Coast Electrical Association and so it was decided to augment this report with photographs showing typical installations of rotating machinery with directed ventilation as developed and used on the Pacific Coast.

Automatic Reclosing Circuit Breaker

Automatic reclosing circuit breakers are beginning to be applied on some of the larger central station systems on the Pacific Coast. One of the companies reports the successful use of this equipment on a number of its more important substations. The automatic reclosing circuit breaker mechanism was furnished by one of the larger manufacturing companies. Another operating company reports placing an order for approximately thirty sets of this equipment and expects to install it within the next six months. Another Pacific Coast company reports the use of re-closing circuit breaker mechanism with the necessary relays, all of which were developed by the engineers of that company. This last mentioned company, the San Joaquin Light & Power Corporation, states thus:

"This mechanism is applicable to any type of switch or oil circuit breaker which trips out from overload, reverse power, or other reason and which it is desired to re-close in a definite time and for a definite number of tryouts if trouble still persists and then lock out the control mechanism of that particular switch, should the trouble not be removed.

"The re-closing mechanism with its interval and limit switches is the same regardless of the number of switches to be re-closed, each switch having its own pin engaging solenoid, slide-rod, pallet switch and control relay. The scheme can be applied to one or any number of switches, and all will close, one at a time only, and in their proper sequence, and only the switch which has kicked out will be re-closed.

"Power for operation of the automatic re-closing mechanism is obtained from a transformer at 110 volts and so located as to be not interrupted when any of the switches to be re-closed kick out. All relays and the single phase motor for the re-closing mechanism operate on 110-volt, 60-cycle current."

The relay which is used is manufactured by the Western Electro-Mechanical Company of Oakland, California. One of the manufacturer's representatives in the Apparatus Bureau has submitted a report covering in general the status of automatic a.c. substations throughout the country. This field is so closely allied to automatic re-closing circuit breakers that it was thought that it would be advisable to incorporate it in this report.

The study of automatic re-closing circuit breakers should be continued and it is suggested that a committee keep on with this work next year. Particular reference should be given to reports on operating troubles so the manufacturers may have as much detailed information as possible by which to correct any defects in design.

Automatic A.C. Substations

One of the manufacturers' representatives of the committee has submitted the following covering in general the status of automatic a.c. substations throughout the country.

Automatic switching has been successfully applied to the operation of incoming lines, transformer stations, and outgoing feeders. In this application the major function is the operation of a particular circuit breaker, or group of circuit breakers, in response to either overload, underload, undervoltage, reverse current or unbalanced power. In other words the automatic switching equipment performs the same operation as would be performed in the case of manual control, only with a more positive and direct action.

Equipment for a.c. substations may be conveniently grouped as follows:

1—Incoming Lines.

- (a) Preferential-emergency incoming lines from a common source.
- (b) Preferential-emergency incoming lines from two independent and presumably non-synchronized sources.
- (c) Parallel or tie lines.

2—Transformer Stations.

- (a) One transformer bank.
- (b) Two transformer banks with "leading" and "trailing" banks.
- (c) Two or more transformer banks with "leading" and "trailing" banks, plus an emergency line.

3—Outgoing Distribution Feeders.

- (a) Equal time intervals between re-closures, any number of breakers re-closing simultaneously.

(b) Equal time intervals between re-closures with a limited number of breakers re-closing simultaneously.

(c) Unequal time intervals between re-closures, any number of breakers re-closing simultaneously.

(d) Unequal time intervals between re-closures, with a limited number of breakers re-closing simultaneously.

Incoming Lines. Preferential-Emergency from a Common Source

At times a.c. substation busses are fed from a generating source by means of two incoming lines. The high tension voltage at the substation is stepped down, as the case may be, to a bus to which the outgoing leaders are connected. One type of a pair of incoming lines is known as "preferential-emergency incoming lines from a common source." Either line may be made the preferential. Voltage failure for a definite time on any phase of the preferential line opens the breaker of this line, and then, if voltage conditions are correct, the emergency line is connected on. Voltage for tripping the preferential line is obtained from the emergency line. The re-establishing of proper voltage conditions on all phases of the preferential line, for a definite period of time, re-connects this line, after which the emergency line breaker is tripped. This permits a transfer without dropping the load.

Incoming Lines. Preferential-Emergency from Two Independent and Presumably Non-Synchronized Sources.

Where the preferential and emergency incoming lines are connected to two independent sources which are not necessarily in synchronism, the operation differs slightly from that mentioned above. The same indications are used for tripping, connecting and re-connecting, the principal difference in operation being that the line breakers are tripped so that the two lines are not connected to the station bus at the same time. Therefore, in switching from one line to the other, the load is momentarily dropped.

Incoming Lines. Parallel or Tie Lines

Parallel or tie lines are provided with the customary balanced power protection. The outgoing feeders are of the radial type. Re-closing is obtained after proper voltage conditions have been re-established for a definite time on all phases of the line which was disconnected. Equipments of the types mentioned above permit an automatic a.c. substation to obtain its supply over two independent lines with the inherent advantages of continuity of service and sectionalizing of the faulty line. Supervisory control and indication may be readily adapted to the above.

Transformer Stations. One Transformer Bank

Transformer stations containing only one transformer bank and a number of outgoing feeders, serve as an excellent example of supplying power to load centers of an economical size in the vicinity of a high tension transmission system. The load is usually mixed industrial and lighting. The transformer in such a case is usually protected by differential and thermal relays.

The automatic operation of such a station is entirely that of the outgoing feeders. The transformer bank is switched on manually and left in this manner until either tripped off manually or by the action of the transformer protective relays. The operation of the outgoing feeders is described in a following section.

An automatic transformer station of this type will provide the following:

(a) Permit the development of new load centers for serving small communities.

(b) Convert attendance charges into profit.

(c) Re-establish service in a positive manner and in a minimum time.

(d) Feeder copper may be decreased by the proper location of a number of such stations.

(e) Sectionalizing of the load may be obtained so that serious troubles may be isolated thereby affecting a minimum portion of the distribution system.

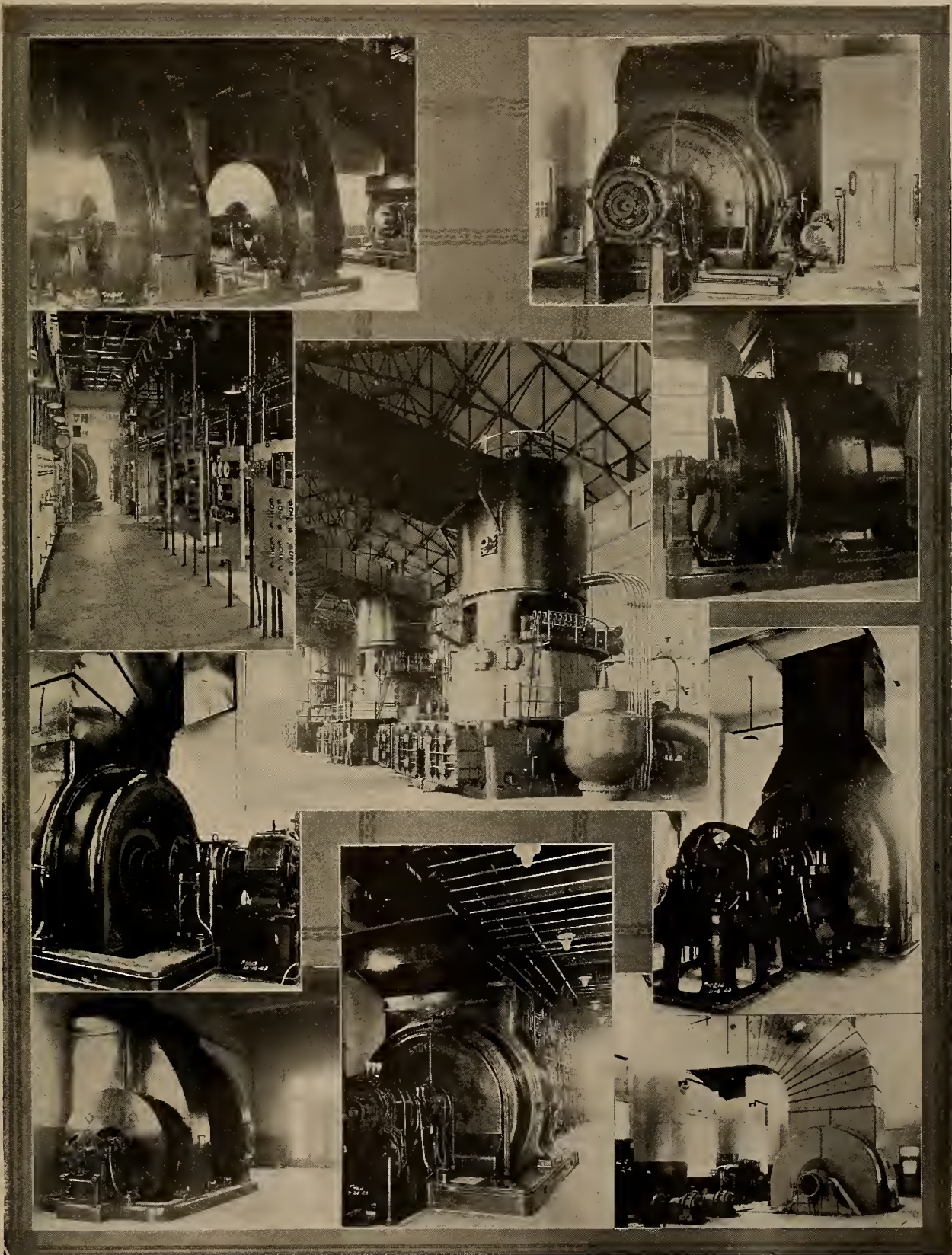
Supervisory control and indication may be readily added to such stations so as to allow the control to be centralized at one point, as for example, the load dispatcher's office. Any oil circuit-breaker may be operated in this manner and an indication obtained of its operation at the remote point.

Transformer Stations. Two Transformer Banks with "Leading" and "Trailing" Banks

Transformer stations are sometimes used where one transformer bank has sufficient capacity to take care of the light load in between peak periods with a second transformer added in response to load demand during the latter periods. Such stations are used where the saving obtained justifies the addition of a second bank with its control. The operation of such a station consists in switching on or off of the transformers, in response to load demand, and in the operation of the feed-

ers. Inasmuch as the feeders are described later only the operations appertaining to the transformers proper will be discussed here.

Differential and thermal protection is provided as previously mentioned. It is possible to make either transformer "leading." The selection is usually made by throwing a double throw switch to the proper position. A totalizing contact making ammeter in each phase measures the total current supplied the low tension bus. At times this current is measured on the high tension side, but due to the saving effected by the use



Typical installations of rotating machinery with directed ventilation as developed and used on the Pacific Coast.

of lower voltage current transformers, it has been found advisable to place these transformers on the low tension side. A different set of transformers must be provided for totalizing, than that which is used for differential and thermal protection.

Continued overload for a definite time in any one phase of the "leading" transformer bank will bring on the second or "trailing" transformer bank. Continued underload, for a definite time, in all phases will drop off the second or "trailing" transformer bank. In case of loss of voltage on the incoming line supplying the "leading" bank, the high and low tension breakers trip before the second bank is brought on. The re-establishing of proper voltage on the "leading" bank will re-connect the latter on again, after which the "trailing" bank will be dropped off or remain on as determined by load conditions.

The operation of the thermal device on either transformer bank will drop that particular bank out of service and hold it there until opportunity is afforded for it to cool as determined by the length of time required for the thermal relay to reset. Operation of any differential relay trips out both the high and low tension breakers of the respective bank. These relays are hand reset, which necessitates inspection and location of trouble before the bank is replaced into service.

Besides having the advantages set forth in the preceding type of substation, this type of substation provides:

- (a) Minimized losses during light load periods.
- (b) Flexibility of operation, with a greater dependability of power in case of line or apparatus failure.

Supervisory control and indication may be readily adapted to this type of substation. Time switches may be provided in place of the contact making ammeters and also for operating lighting feeders.

Transformer Stations. Two or More Transformer Banks with "Leading" and "Trailing" Banks Plus an Emergency Line

A more advanced form of automatic substation is obtained when two or more transformer banks are used together with an emergency line and its transformer bank. The latter may replace any or all transformer banks, in the case of failure of the other lines or of a failure or overheating of any transformer bank. Such substations are usually located in large cities where an opportunity is provided, due to the widely changing load, to use a number of transformer banks; and where, due to the dependability of power required, an emergency line must be provided.

In such a substation, differential and thermal protection is provided for the transformers. The operation of the outgoing or distribution feeders is described in a following section.

Assume that there are three incoming lines with their respective transformer banks and an emergency line with its respective bank. During light load periods one bank can carry the entire load. Each bank has its own supply line direct from the generating source. Bank No. 1 carries the load during light load periods. Due to increased load as shown by increased current in any phase for a definite time, indicated by totalizing ammeters, Bank No. 2 is connected on, and the substation bus is "cut" so that Bank No. 1 feeds its share of the load direct, while Bank No. 2 carries the remaining outgoing feeders. A further increase in load demand, brings on Bank No. 3 and the substation bus is further "cut" so that each bank feeds its own share of the load direct and without any interconnection with the other lines. Radial feed, direct from the generating source, simplifies the control and eliminates complicated protective circuits that would otherwise arise.

If, while Banks No. 2 and No. 3 are connected on, and the load decreases in all phases, for a definite time, the station bus will be re-connected so as to transfer the load to either Banks No. 2 and No. 1, or No. 1 alone (as the case may be) without dropping the load.

Voltage failure or overheating will drop off any bank which in turn will be replaced by the emergency bank. Re-establishing of proper voltage conditions or cooling will re-connect the particular bank after which the emergency bank will be disconnected. This type of station has a greater degree of flexibility and provides for a greater continuity of service than those previously described.

Outgoing Distribution Feeders

Practically all outgoing feeders are of the radial type. In general the operation between various types of control differs but slightly. After the breaker has opened on overload it remains open for a time interval (which may be equal or vary) and is then re-closed regardless of external circuit conditions. In this way the operation duplicates that usually obtained manually. This operation is repeated a number of times at suitable time intervals, and if the circuit conditions are such as to cause further tripping the breaker is locked out by a hand reset relay. The disappearance of overload conditions before a fixed time has expired allows the control equipment to reset and thus have available a fresh sequence of operations.

The operation of these equipments is identical whether used in manually or automatically operated substations. They have proved especially applicable to large manually operated substations with a large number of outgoing feeders.

These equipments are in general a grouping of standard devices acting as a unit. The main circuit interrupting device is the same as used in manual operation with a possible addition of a suitable mechanism. The assembly of the devices on a structural steel framework for voltages up to and including 6,600 gives sufficient compactness and rigidity so that the equipment may be treated as a unit in its course of manufacture, shipment, installation and operation. For voltages over 6,600 it has been found desirable to locate the breaker, mechanism, etc. remote from the switchboard panel.

One type of outdoor equipment has been designed in which a standard indoor breaker, with mechanism and relays are placed in a suitable steel housing. A second type of outdoor equipment is designed so as to least alter the general construction of the circuit breaker supporting framework. In other words, the enclosing case for the relays, panel and mechanism is adapted to the breaker.

Outgoing Distribution Feeders. Equal Time Intervals. Any Number of Breakers Re-Closing Simultaneously

Equal time intervals between re-closures are provided by the use of a definite time-delay relay which resets after each closing operation of the circuit breaker. The tripping of the breaker also actuates a notching relay which, in a way, counts the number of operations. If a breaker trips a sufficient number of times, within a fixed time interval, the contacts of the notching relay open and prevent further automatic operation. The notching relay must then be reset by hand. In one form of this control no provision is made against overloading the control source due to the closing a number of breakers simultaneously.

Outgoing Distribution Feeders. Equal Time Intervals, with a Limited Number of Breakers Re-Closing Simultaneously

The operation here is the same as that previously described with the exception that the control is so arranged that only one or a limited number of breakers may be closed at a time thus decreasing the size of storage battery required for control power. This method of control is not recommended where a.c. control is used since it has been found cheaper to provide the extra kilowatts of control power than to add the necessary interlocking devices in the control circuits.

Outgoing Distribution Feeders. Unequal Time Intervals. Any Number of Breakers Re-Closing Simultaneously

Unequal time intervals between re-closures are obtained by the use of a motor operated timer having three contact arms, set at different angles. The timer is adjusted so that a complete cycle is performed in a definite time, usually from 2 to 3 minutes. The various angles between the contact arms represent different time intervals. Once released the timer arms move in the same direction until they reach their normal position. In this manner the cycle of operation is determined by the timing device. The breaker must be stripped at suitable intervals in order to obtain the maximum number of re-closures available in one cycle of operation of the timer. As contrasted with the method of control mentioned in the two previous sections it

will be noted that in the latter methods the breaker itself determines the number of re-closures.

With the control giving unequal time intervals, the breaker is locked out if it should be opened a few seconds before the timer reaches its normal or zero position. In this manner it may miss one or even two re-closures and still be locked out after tripping the second time. Such a condition, however, is more or less remote since the overload conditions usually are of such nature as to obtain successive tripping.

Outgoing Distribution Feeders. Unequal Time Intervals, with a Limited Number of Breakers Re-Closing Simultaneously

This method of control is practically the same as that mentioned in the foregoing section and has the same features in the method of protecting the control source from overload as mentioned under the corresponding type of control with equal time intervals. Equal time intervals between re-closures take care of most requirements for industrial service, that is, mixed power and lighting load. Unequal time intervals between re-closures are provided with equipments where practice has shown that after the first re-closure the breaker will usually remain closed. For subsequent operations the interval is gradually increased so as to lessen the duty on the oil circuit breaker.

The idea of a unit design of a.c. feeder equipments has the advantages as outlined in the introduction to this section. The equipments re-establish service in a minimum time with the same degree of reliability at all hours. They permit the supplying of small load centers with a greater return in revenue than would be obtained in the case of manual operation. In the case of larger load centers this feature is more pronounced. At times it has been found advisable to operate feeders of this type by means of supervisory control so that the control and indications are obtained at one central point.

Relays and Relay Application

During the past year there has been a decided trend among the Pacific Coast central stations towards the application of modern types of relays for the purpose of sectionalizing a portion of transmission line which is short-circuited, or grounded. In large inter-connected high tension networks it is vital that the section of the network in trouble should be removed from the system before synchronous apparatus falls out of step and the whole system is split up with the resulting interruption to service. The discussions of the Apparatus Bureau on this subject were devoted largely to the result of the use of specific types on the systems and taken part in by the members representing such systems. Methods of checking relay operations, relay maintenance, and methods of keeping records of relay performances were brought out.

The use of double trip relays in place of the single trip type with the necessary auxiliary relays is apparently gaining in popularity on the Pacific Coast and one large company has adopted this type as its standard.

The use of double trip relays has the advantage in that it tends to simplify the control wiring. On the other hand, it will be necessary to determine if the double trip contacts will remain in adjustment after being in service for some time so there will be no question as to the reliable performance of this relay. Two of the large manufacturing companies are now supplying induction type relays equipped with operation indicators. This attachment, which is really an internal annunciator, will be of considerable value in analyzing relay operations and studying transmission line shorts. The Pacific Coast companies are now beginning to purchase relays equipped with this device and some are going so far as to install the operation indicator in relays already in service on their systems.

The practice of sealing relays in the same manner as integrating kw.-hr. meters are sealed is being seriously considered by some of the Pacific Coast central stations. One large company has definitely decided to put this policy into effect. It is felt that the importance of relays in isolating short circuits and minimizing system interruptions justifies that all possible means be taken to prevent any unauthorized changing of relay settings. Such settings must be based on a consideration of the system as a whole. A change of setting in a relay at a certain station without consideration of

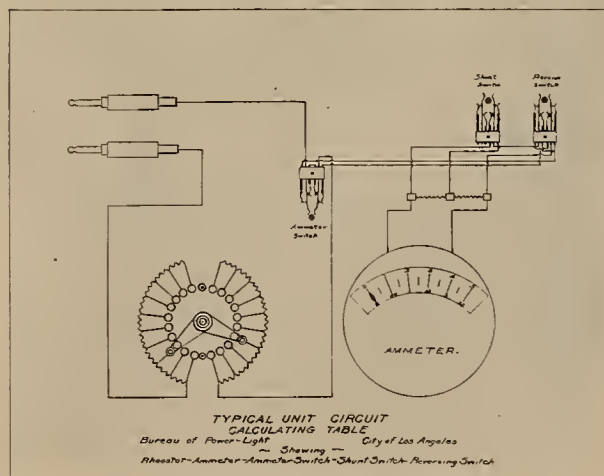
the other stations on the system can only result in faulty operation at the time of a short circuit on the system.

The successful application of relays for the purpose of clearing trouble on long transmission lines operating at the highest voltage yet attempted (220 kv.) is reported by two large California systems. The value of relays, when combined with suitable oil circuit breakers, for isolating a section of line which is suffering from a flash-over has been thoroughly proved. Before the application of relays for automatic circuit breaker operation a flash-over on an important high voltage transmission line would result in a system shut-down for a period of from one-half minute to several minutes. Since the application of relays, the only evidence of a flash-over is the automatic opening of the oil circuit breakers at each end of the section of the transmission line in trouble. The system suffers no interruption;—the only indication being a drop in voltage of about ten per cent for a period of fifteen seconds.

The impedance or distance relay which has only been on the market for a short time offers considerable promise for successful application in complicated transmission networks. One system on the Pacific Coast reports an installation covering a number of relays in a small loop, but up to this time there is very little to report covering the results obtained by their use. It is expected that there will be more installations of this type of relay on the Pacific Coast during the coming year.

The advantage of systematically reporting, tabulating and analyzing operating troubles which cause system interruptions is more apparent each year. One large company reports that the dispatching supervisor tabulates the service interruptions classified under cause and potential and from this classification the engineers concerned determine what steps to take to minimize interruptions in the future. It appears that, if possible, a standard method of reporting and exchanging information covering causes of system interruptions on the various Pacific Coast systems would accomplish much good. It might form a basis for future designs of machinery and lines and possibly suggest corrective measures in operating routine. It is believed that this subject is of sufficient importance to justify the appointment of a sub-committee of the Apparatus Bureau, Pacific Coast Electrical Association, to study the subject more thoroughly next year.

The principal work which has been undertaken by the national relay sub-committee this year has been in preparing, editing, and advance selling of the Relay



Typical unit circuit calculating table used by Bureau of Power and Light, Los Angeles, Calif.

Handbook in which the Pacific Coast members of this sub-committee have assisted. It is gratifying to note that although the allotment to the Pacific Coast was 200 copies, advance orders for approximately 350 copies have already been secured, and it appears as if 500 copies will be absorbed in this territory. The Relay Handbook will serve as the report of all the work of the National Relay Sub-Committee up to the date of publication. It "will be a complete treatise on the subject of relays, including illustrated descriptions, direct

and alternating current relay schemes, methods of trip, a study of relay current and potential transformers, calculations of short circuit values in alternating current systems, calibration, maintenance, testing, and records, with a complete bibliography."

The calculation of the current flowing on a transmission network at the time of a short circuit becomes quite involved and is somewhat laborious when the system consists of more than a few generating plants, transmission lines and sub-stations. To overcome the necessity of this tedious calculation a device, known as a calculating table or board, is coming into general use throughout the country. The engineers of some of the Pacific Coast systems felt that the calculating table which had been in general use was too elaborate and, consequently, calculating tables are being devised which are less expensive and thoroughly satisfactory for the system concerned, even though they lack the flexibility of some of the other tables in use in the country. A short description of two calculating tables now in use on the Pacific Coast is included as part of this report.

**Calculating Table for Calculating Short Circuit
Currents on Distribution Networks as Built by
Bureau of Power and Light, City
of Los Angeles**

Short circuit calculating tables are of two general classes—first, those which are built up of fixed values of resistance adapted for one particular system and second, those built up of adjustable resistances which may be set for any system or part thereof. After investigating the two different classes, the Bureau of Power and Light decided that inasmuch as their distribution system was changing very rapidly due to growth, the second type of table would be of much greater service to their department.

For their present system it was decided to build a sixty unit table, but so constructed that extensions could be added at any time. Following out this idea the table was divided into two sections of thirty units each, built up on individual structural steel frame work the sections being bolted together by four bolts through the angle iron. Two detachable ends were built so as to give a finished appearance and protect the interior. At any time that it is desired to increase the size of the table, one end may be detached and another section of thirty units added.

The photographs herewith show the general arrangement of the table. The resistance units are of Ward Leonard manufacture of 4,400 ohms each. They



Sixty-unit calculating table as used by the Bureau of Power and Light, Los Angeles, Calif.

are mounted in groups of five on a Micarta panel, each panel being fastened to the steel frame work independently. Each unit is divided into ten steps of 400 ohms each and ten steps of 40 ohms each, which are connected to contact buttons mounted on the front of the Micarta. Two contact levers are provided, pivoted at the center of the circle of contacts and electrically connected to each other, which short circuit any desired per cent of the rheostat. The 400-ohm sections represent 10 per cent reactance and the 40-ohm sections 1 per cent; the total rheostat thus represents 110 per cent reactance.

For the purpose of making connections between the different units, there are provided seven hundred and twenty, one-wire telephone jacks. These jacks come mounted on jack-strips of hard rubber and ten to the strip. The ten jacks on every strip are shorted together thus forming a bus. The jack-strips are laid one upon the other in vertical tiers twelve high. There are three tiers to the section or six tiers in the total table. All jacks on the bottom row of each tier are connected together across the total board and tied to the positive terminal of the motor generator. Likewise, the second row are all connected together and connected to the negative terminal of the motor generator. This leaves ten rows of ten jacks in each vertical tier, or sixty independent busses on the total table for connection purposes in setting up the net work. The terminals of each rheostat unit terminate in one-wire telephone cords equipped with one-wire plugs. These cords drop through holes in the table leaving the plugs standing vertical and are arranged in pairs along the length of the table as shown in the photograph.

Corresponding to each pair of cords there is a row of sixty telephone keys. A key is thus provided for each rheostat and its purpose is to cut an ammeter into the circuit. This is clearly shown in the accompanying wiring sketch. There is also provided a key for reversing the polarity on the ammeter. This ammeter is provided with two scales. A double-throw telephone key shifts from one scale to the other. The maximum readings of the two scales are 0.5 amperes and 0.05 amperes. Current is supplied for operating the test table by a small vertical motor generator set.

To operate the board, the distribution network it is desired to investigate is reduced to a convenient base kva., by multiplying the reactances of all generating and transforming equipment by the ratio of the chosen base kva. to the kva. capacity of the particular equipment.

Line reactances are also reduced to the base kva. by the following formula:

$$\text{Per cent Reactance} = \frac{\text{Base kva.} \times \text{Reactance (ohms)}}{(kv.)^2 \times 10}$$

where kv. represents kilovolts at which the line is operated.

One terminal of all the rheostats representing generating equipment is plugged in on the positive bus, the other terminals are tied to busses to which are connected the various lines and transformers of the network under investigation. The rheostats are set to the percentage reactance (reduced to the base kva.) corresponding to the particular apparatus or line or group of lines it is intended to represent. When completed, the table represents a miniature distribution system similar to that under investigation. Ohmic resistance of the system is neglected, the reactance being represented on the calculating table by resistance. This leads to some error, giving short circuit values too high but the error is usually small and on the safe side.

To study the effect of a short circuit at any point of a system thus set up, it is only necessary to connect the point to the negative bus, then by means of the switch keys, ammeter readings may be taken on any line transformer or generator and the magnitude and direction of the current recorded. By setting the rheostat of one unit to zero, the cords to this rheostat may be used for this purpose and the total short circuit current which occurs at this point may be read on the ammeter. The current which is read on the ammeter, multiplied by a constant, gives the value of the true short circuit current that will flow in the system under investigation.

If the instantaneous reactance of the synchronous equipment (reduced to the base kva.) is used in setting the rheostats representing the generators and synchronous impedance, then

$$I_0 = \frac{(\text{Base kva.}) \times 1,000}{1.73 \times .025 \times E} \times i$$

where

I_0 = Instantaneous amperes, effective value, symmetrical wave.

E = Line voltage.

i = Amperes as read on short circuit calculating table ammeter.

The total reactance of the system to any point of short circuit is obtained from

Per cent Reactance = $\frac{C}{1.73 E I_0}$

where C is normal capacity of total connected synchronous apparatus.

Knowing the value of C and per cent reactance of the system to any point of short circuit, the value of short circuit current may be obtained at any time after short circuit occurs, from decrement curves as published by Messrs. Hewlett, Mahoney, and in the Burnham American Institute of Electrical Engineers Proceedings, Feb. 1918.

Thus it is possible to determine the kva. breaking capacity required on any oil switch for any time setting of the relays. The peak value of current, first half cycle, no load, unsymmetrical wave, is

$I_1 = 2\sqrt{2} I_0$

It is the above value of current which is to be used in calculating the mechanical strain to which any apparatus is subjected at the instant of short circuit. So far the table as constructed by the Bureau of Power and Light has given perfect satisfaction and has been a great help in solving questions involving magnitude and direction of current values due to short circuit on their system.

Edison Calculating Table. Description of Equipment for Calculating the Short Circuit Current at Any Important Point on the System

The application of oil circuit breakers in the generating plants and substations of a system such as that of the Southern California Edison Company demands that the current interrupting duty of the oil circuit breaker at time of severe short circuits be definitely determined in advance. A transmission system such as this which consists of a complete network of high tension lines makes the necessary calculations exceedingly complicated.

A calculating board of the vertical type as shown in the illustration has recently been completed by the shop and is now in daily use in the protection engineering department of the Southern California Edison Company. This equipment is in the form of a cabinet in which suitable resistance units and telephone jacks are mounted and connected in the same electrical relation as the 220,000 and the 60,000-volt transmission system. The front of the cabinet is a three-ply, 4 ft. x 3 ft., wooden panel, enameled in white on which a diagram showing

the powerhouses, substations, switching stations, and transmission lines is painted. These stations are placed in the most convenient diagrammatic form because a geographic arrangement of a system the size of this company would necessitate an extremely large panel in order to locate stations in congested territory.

The reactance of each generator, transformer, and synchronous condenser was obtained from data furnished by manufacturers of this equipment and the reactance of the transmission lines was calculated from the physical characteristics of these lines. In designing the calculating board these reactances were reduced to reactance values based on 500,000 kva. When installed on the calculating board these reactance values are represented by equivalent values of resistance. Each generator, transformer, transmission line and synchronous condenser on the 220,000 and 60,000-volt system is, by this means, represented by the proper value of resistance which is connected to the adjacent resistance in the same electrical relation as the actual equipment in use on the transmission system. The resistances corresponding to the synchronous machines are connected between the network of resistances of the transmission lines and the positive bus bar while the resistances corresponding to the lines are connected to the negative bus. Means are then provided to impress a potential of 100 volts, direct current furnished by a 500-watt motor-generator set, across the negative and the positive bus bars. At each location representing a station bus and in the middle of each transmission line suitable permanent taps are brought out from the network to the front of the board. Telephone jacks, designed to be normally closed, are provided in each position corresponding to each major oil circuit-breaker on the system. Dummy plugs made of an insulating fiber can be inserted in any jack which action corresponds to opening the circuit-breaker thus cutting the piece of equipment out of service.

A short circuit is then put on the system at any point desired. This is accomplished by means of a flexible wire of negligible resistance permanently attached at one end to the negative bus. The other end is provided with a clip so that the lead may be readily attached to any of the taps at a substation bus or on a transmission line and thus produce the short circuit. A telephone plug can then be inserted in any of the telephone jacks used to represent the oil circuit-breakers on the actual transmission system and by this means the current flowing in this switch at the time of a short circuit can be determined. It is also possible to measure the total current in a short circuit on a bus and to determine in which direction the current is flowing under these conditions.

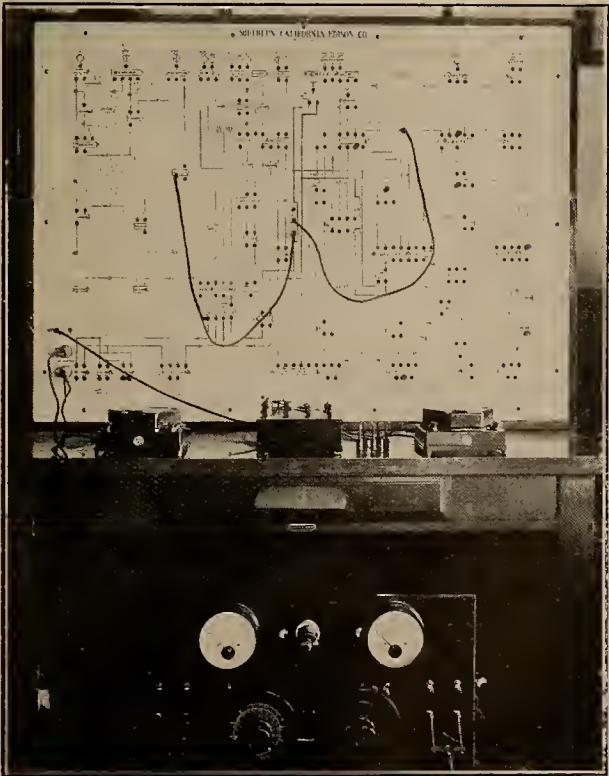
The value of current measured by the ammeter is multiplied by a constant of 500,000. This gives the instantaneous value of the short circuit in kva. In order to calculate the short circuit current at any point it is necessary to know the total synchronous capacity of the machines connected to the system and the equivalent full load current of the machines at the voltage of the line where the short is applied. Then

$$\frac{\text{Synchronous capacity} \times 100}{\text{kva. at the short}} = \text{per cent reactance.}$$

Tables are provided which give the constants for various per cent reactances which multiplied by the full load current give the short circuit current.

In a system such as this the current flow is enormous at the time of a short circuit on the bus of some of the larger substations. The following examples will give an idea of the short-circuit current possible and will also indicate the value of introducing a small time element when an oil circuit breaker is called upon to clear a short circuit:

Station	Value of Initial Current	Value of Current at the end of 0.2 Sec.	Value of Current at the end of 2.0 Sec.
	Amp.	Amp.	Amp.
Laguna Bell	22,300	12,200	9,440
Eagle Rock	17,950	10,700	8,370
L. A. No. 3	16,900	10,350	8,640
Newmark	19,400	11,350	9,120
Long Beach			
Steam Plant	16,300	9,950	8,200
L. A. No. 3 to MacNeil 60-kv. Line	9,870	7,150	6,530



Vertical calculating board as built and used by the Southern California Edison Company.

From the above current values it can be seen that extreme care should be taken to apply circuit breakers capable of rupturing such short circuits if prompt and successful isolation of the short circuit from the system is to be accomplished.

Proposed Change in Transformer Polarity

At the present time the National Electric Light Association transformer standards provide the following:

“Standard Polarity for Single-Phase Transformers.

“The standard polarity for single-phase constant potential distribution and power transformers for lighting and power is as follows:

“Subtractive polarity shall be standard for all single-phase transformers, excepting those in sizes 200 kva. and smaller whose high voltage ratings are 7,500 volts (delta) and below, for which additive polarity shall be standard.”

It has been proposed to change the present standard to a single standard of subtractive polarity for all transformers. The advocates of this proposed change point out that various advantages would result if a single standard was adopted. The central station systems on the Pacific Coast however are decidedly opposed to a change as they feel that the extent of the western systems and the number of distribution transformers in use offers a great many disadvantages to making such a change. The subject was discussed in the meetings of the Apparatus Bureau and it was the opinion of the meetings that no change in the present standard should be made. The subject is of sufficient importance however to take the matter up in detail with the operating and engineering departments of the central stations on the Pacific Coast and get an expression of opinion from this source.

The following is submitted by the transformer engineers of the General Electric Company as a supplement to a previous report on this subject.

Comparison of Transformers on Basis of Losses

In the report of the Distribution Transformer Sub-Committee of the Apparatus Committee of the Pacific Coast Electrical Association, as published in the June 1, 1923 issue of the Journal of Electricity, the attempt is made to compare three-phase and single-phase transformers by plotting a function of the product of the losses against kva. capacity. Criticism was made at the time of this particular method of comparison, but no alternative offered. It is now desired to propose a basis for plotting which is both logical and accurate, this scheme having been suggested by the transformer engineers of one of the manufacturing companies.

Both schemes recognize the product of the iron and copper losses of a given transformer as a constant, being independent of the ratio of iron and copper losses and independent of the voltage and current at which the output is secured. This product, often called in the past the “equivalent total loss” of a transformer, cannot, however, be used directly as a basis of comparison as is done in the sub-committee report referred to, for it is not only illogical but leads to unreasonable results.

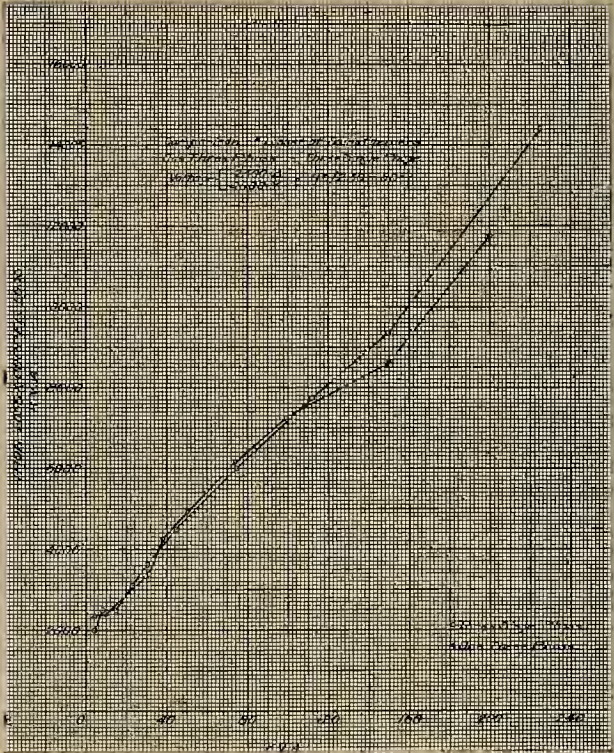
For instance, plotting the per cent equivalent total loss, of various sizes of transformers as so defined, it is found that the larger the kva. rating of a machine the larger is its per cent equivalent total loss. Such a result is of course inadmissible. The larger the transformer, the smaller are its per cent losses; and if some arbitrary definition of an “equivalent total loss” makes its percentage value to increase with the size of the transformer, its appropriateness as a basis of comparison becomes questionable. However, defining the equivalent total loss as that minimum total loss at which a unit can deliver its rated kva. output (assuming the most favorable values of current and voltage), this value being approximately twice the square root of the loss product, we get an equivalent total loss which is somewhat less than the sum of the normal iron and copper losses, and its percentage value decreases with increasing size of transformer as it ought to do.

This minimum total loss combination of voltage and current exists in the same sense in which barometric readings are reduced to the basis of sea-level, regardless of whether or not the towns can actually be lowered to that level. The formula, Equivalent Total Loss = $2\sqrt{L_i \times L_c}$, in which L_i is the iron loss and L_c is the copper loss, is an old one, and its derivation can be found in “A Treatise on Transformers” by Bohle and Robertson, page 172.

For illustration, plot the comparison of losses of 2,300/4,000-volt single-phase and three-phase transformers. Curve 1 is practically a duplicate of Fig. 2 in the sub-committee report referred to. Curve 2 plots these data in terms of per cent equivalent total loss as defined above. Comparing the information furnished by the two curves, we note the following:

CURVE 1

- 1. Plots $L_i L_c / \text{kva.}$ as a loss index or characteristic-loss for various sizes of transformers.
- 2. This loss index or characteristic loss does not correspond directly to any concrete physical characteristic of the transformer in which an operating engineer may be interested; not even something which the average engineer can visualize or comprehend. It is a purely mathematical quantity. For instance, for a 150-kva.



Curve 1.

three-phase unit the characteristic-loss is given as about 8,600, but this is not the value of the total loss either in watts or in percentage.

- 3. The per cent loss index (or per cent characteristic-loss) increases with increasing size of transformers.
- 4. Comparing the characteristic-loss of a 150-kva. three-phase unit (which is 8,600) with that of a 150-kva. bank of three single-phase units (which is 9,300) we find that the bank of single-phase units is 8.5 per cent higher. This per cent difference, however, applies neither to the actual losses nor to the total minimum losses.
- 5. The loss-index or characteristic-loss is evidently a straight-line function of the apparatus size. This can apply neither to the total actual loss nor to the total minimum losses.

CURVE 2

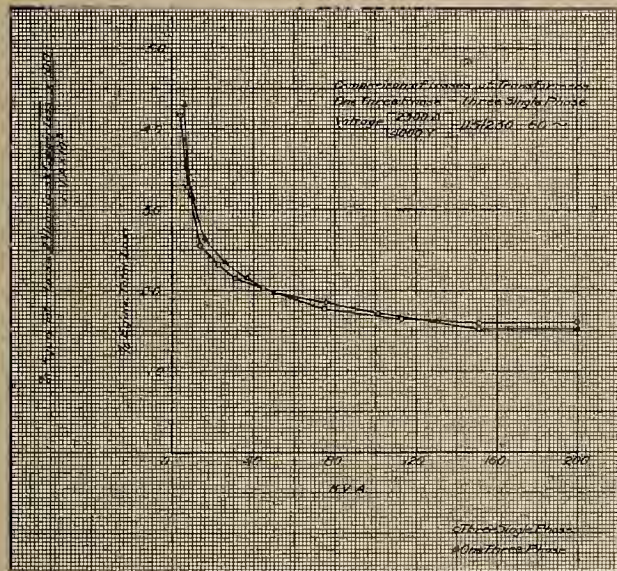
- 1. Plots $0.2 L_i L_c / \text{kva.}$ as the loss-index or characteristic-loss for various sizes of transformers.
- 2. The loss index or characteristic-loss represents the per cent minimum total loss at which a unit or bank can deliver its rated kva. output, assuming the most favorable values of current and voltage. For instance, for a 150-kva. three-phase unit this is 1.5 per cent which is the minimum per centage total loss. The per cent total loss of such a unit at its rated voltage and current is usually somewhat higher than this, because designs are made to approximate the best efficiency not at full load but all year around.
- 3. The per cent loss-index (or per cent characteristic-loss) decreases with increasing size of transformer.
- 4. Comparing the characteristic-loss of a 150-kva. three-phase unit (which is 1.55 per cent) with that of a 150-kva. bank of three single-phase units (which is 1.6 per cent), we find that the bank of single-phase units is 3.5 per cent higher. This applies strictly to the total minimum losses of the two alternatives, and applies also approximately to their total actual losses.
- 5. The loss curves are curved in accordance with the law that the per cent losses of transformers vary inversely as the fourth root of the kva. rating, assuming that the densities, space-factors, etc., are alike.

It is therefore recommended that loss comparisons be made on the basis of $2\sqrt{L_i L_c}$ for equivalent total loss in watts, or $0.2 L_i L_c / \text{kva.}$ for per cent equivalent

total loss. When convenience in plotting or extrapolating is very important, logarithmic scale plotting paper may be used.

Station Electrical Grounds

The question of the proper design and preparation of station electrical grounds for generating plants and substations is assuming more importance each day as the central station systems grow in capacity. The high values of current which must now be dissipated in the earth at the time of an accidental ground on a transmission line make necessary the installation of more elaborate grounding systems than was necessary when the systems were smaller, together with the fact that the successful operation of the extra high potential transmission lines in the West has resulted in unusual efforts



Curve II.

to install adequate grounding systems. This subject was discussed at each of the meetings of the Apparatus Bureau and a number of features of design was brought out.

The subject of grounding electrical equipment in generating plants and substations requires the consideration of three fundamental considerations.

1. That current always tends to pass from the accidentally grounded portion of the system to the generator or transformer neutral or a weaker part of one of the other phases.
2. That the current will follow the path of least resistance.
3. That the potential gradient of a conductor placed in the ground can possibly be quite pronounced when the conductor is energized.

In order to accomplish the first it is advisable and generally necessary to connect the neutrals to a ground plate or system of plates or pipes which are located at permanent moisture. When considering the second it is necessary to see that the conduits which control wiring running from the transformers and switchboard and from the switchboard to generator or synchronous condenser be shunted with heavy copper conductors. This is especially true when the neutral of a generator is grounded and it is advisable that the copper shunt be located near the conductor running between generator to transformer. When the third is taken into account it is very important to distribute copper in the earth under any parts that may be touched when a person is standing on the ground. Connections should then be made between all steel or piers near the earth's surface and the grounding system.

A network of copper constituting a grounding system serves two purposes: (1) To give the grounding system sufficient current dissipating capacity to prevent the potential of the entire substation rising to a dangerous potential between the accidental ground and the substation which would endanger life at remote points on a transmission line and (2) it tends to keep the potential of the steel structures around a substation at approximately the same potential as the surface of the soil and thus minimizes the danger of harm to a person who may be touching the steel at the time he is standing on the ground.

All of the above is a short analysis of the problem from the standpoint of the designer. From the operating standpoint it is becoming increasingly important to adopt a satisfactory means of testing electrical grounds and to make these tests periodically. More tests should be made to determine the resistance of the ground connections between various generating plants and substations on the systems in the West. The San Joaquin Light & Power Corporation has made some experiments along this line and it would be of considerable value if more work of this same nature was done on other systems.

The Apparatus Bureau suggests that a committee on grounding and the testing of electrical grounds be allowed to follow this subject up more thoroughly next year.

Electrically Operated Hydraulic Valves

By GEORGE H. BRAGG*

ONE of the numerous refinements found in modern hydroelectric developments is the remote control of important penstock valves by means of electrical apparatus. This feature has been introduced in some cases, as a safeguard to the plant; in others, as an economic convenience, while in others it is a factor in automatic operation. So reliable has the manufacturer made his product that most operating engineers now consider their plants safer with the valves remotely controlled than they were when dependence was placed in manual effort. A survey, having been made of some of the more recent installations by Pacific Coast companies, a description of a few of them will serve to point out features which make them successful.

Fig. 1 shows a wiring diagram of electrical circuits for operating three butterfly valves located at the upper ends of three penstocks. These valves can be opened or closed by a switch at the power house or by a similar one in the gate house. Energy may be supplied from

either of several sources available at the power house. An overhead circuit is dedicated exclusively to this service. Indicating lights in the power house inform the operator of the position of each valve and also the presence of power at the valves. Limit switches aided by solenoid controlled brakes stop the motors when the gates are in the open and closed positions.

In Fig. 2 is shown the general arrangement of a very recent development, in which there is but one penstock and one unit. The butterfly valve is operated by a motor wired as per Fig. 3. Power is furnished from the station bank, which may be energized by the transmission line or by the unit. This valve can be operated at either of two control stations, one in the power house and the other in the valve house. Unlike that shown in Fig. 1, however, this valve can only be closed by the switch in the power house but may operated in either direction by the one in the valve house. In making this provision, it has been assumed that, in case of accident, failure or an emergency, the valve should be closed as quickly as possible by the operator but under no circumstances is it necessary or advisable to open the valve by means of the remote control.

The opening operation is never done without first equalizing the pressure on each side of the butterfly by filling the penstock through the by-pass valve. At such (infrequent) times, an attendant will be sent to the

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valve house for this purpose and also to open the main valve, which of course, he can do by manipulating the control switch. The stopping of the mechanism in this installation is done by a limit switch without the aid of a solenoid brake. Indicating lamps are omitted inten-

lights are provided alongside of the control switches. The mechanism is equipped with hand gear to be used as a substitute for the motor drive. Each motor is direct connected through a friction clutch. This is designed to slip in case of a failure of the limit switch to

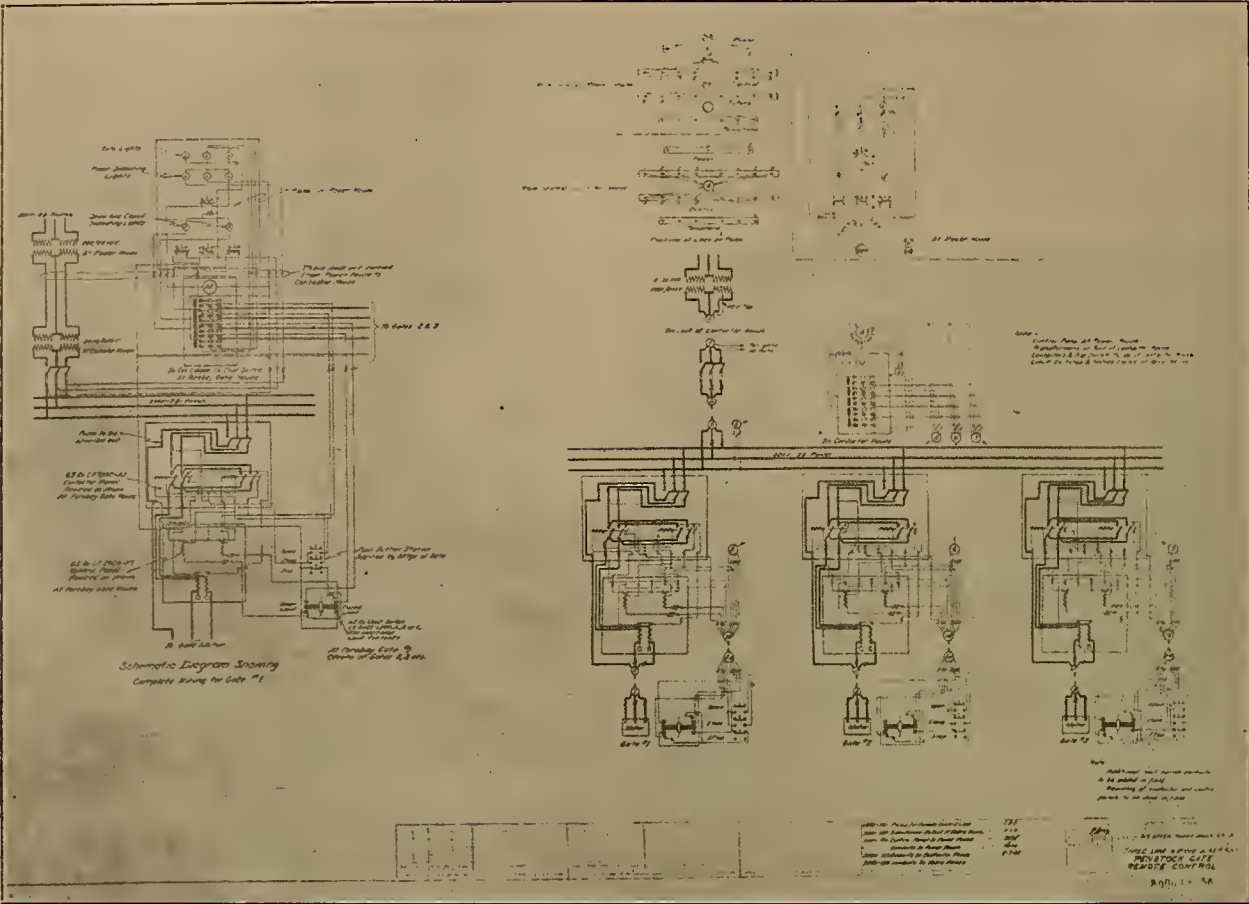


Fig. 1.—Wiring diagram showing electrical circuits for operating three butterfly valves located at the upper end of three penstocks.

tionally because they would be superfluous in this particular installation. The contactor switches are interlocked electrically to prevent both from being closed simultaneously.

The valves shown in Fig. 4 are used for a somewhat different purpose than those previously described. In this case, they are bolted to turbine scroll cases and their function is to stop the flow of water to the tur-

stop the motor and also to disconnect the motor when the mechanism is being operated by hand.

Still another type of gate control is shown in Fig. 6. Here we have two needle valves actuated by motors connected as shown; these valves automatically regu-

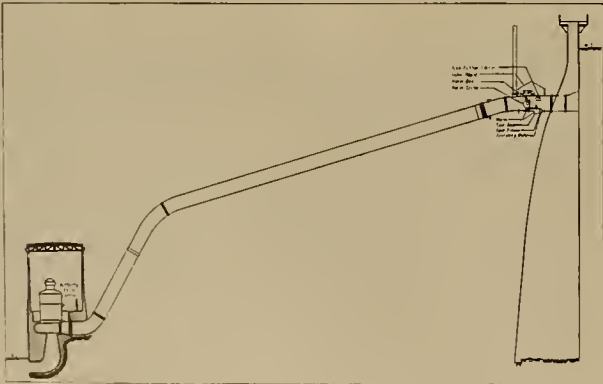


Fig. 2.—Single penstock and single unit installation.

bines under any emergency condition that might arise. The valves may be operated in either direction by control stations at the switchboard. It is presumed that the operator will equalize the pressure through a bypass (not shown) before opening the main valve. The mechanisms are limited in their travel in either direction by a switch actuated by small gears and a screw driven by the main gearing. This limit switch opens the contactor control circuit which energizes the motors as shown in the wiring diagram Fig. 5. Indicating

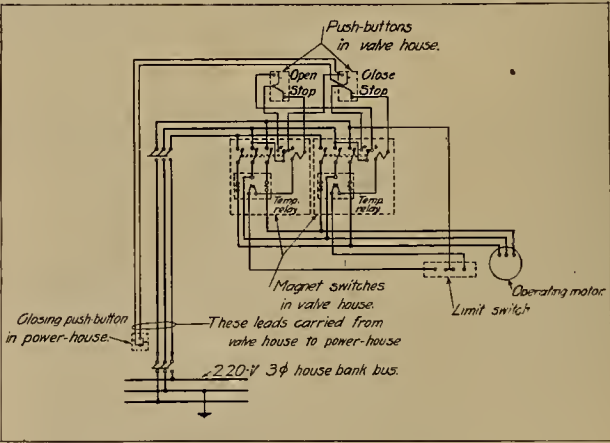


Fig. 3.—Wiring diagram for motor operated butterfly valve.

late the quantity of water in the jets to correspond with the varying supply in the ditch. No appreciable storage is available in the forebay, which consists merely of a comparatively small header box tapped by the penstock. Constant water level over the entrance to the penstock is maintained by a float-controlled switch wired to operate the valve motors which in turn adjust the size of the opening of each nozzle. A limit switch operated through small gears stops the motors at the extreme positions of travel of the needles. Failure of the limit

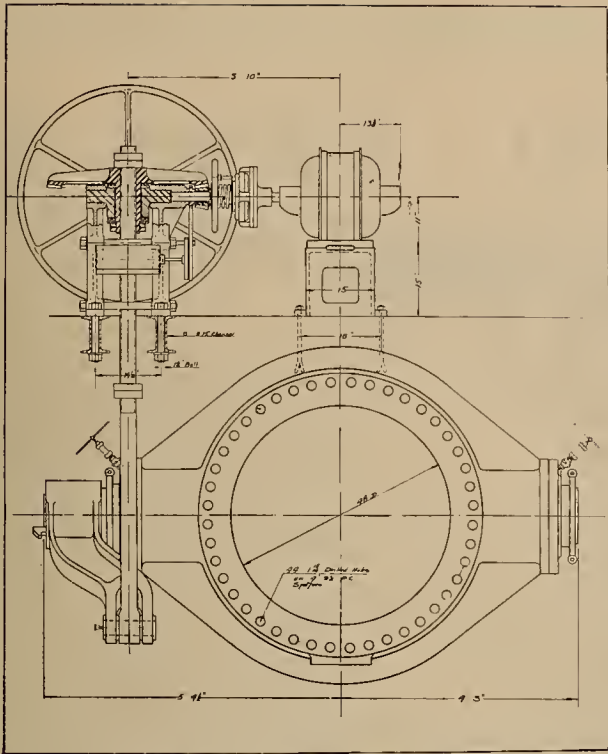


Fig. 4.—Valves bolted to turbine scroll cases and designed to stop the flow of water in emergencies.

switch to function can do no damage because the pinion on the motor shaft drives through two friction discs made of fibre. The complete wiring diagram is shown in Fig. 7.

The present practice in remote control of gate valves may therefore be summarized in the following statements:

Power Supply—Several sources of power should be supplied if possible for dependability, especially under emergency conditions.

Control Stations—Switches should be distinctively designated and labeled plainly so they will not be mistaken by any one. The number of stations should be limited to a minimum. They should be located in most convenient places, yet accessible to the operator in any emergency. Switching combinations should be made as "fool-proof" as possible, such for instance as the omission of the "opening" control switch from the remote stations as previously described. Indicating lights in general should be provided but in some installations they can be omitted if they are of no assistance to the operator.

Control Circuits—The maximum of reliability is obtained by using lead covered conductors placed in conduit. External circuits to remote locations may be

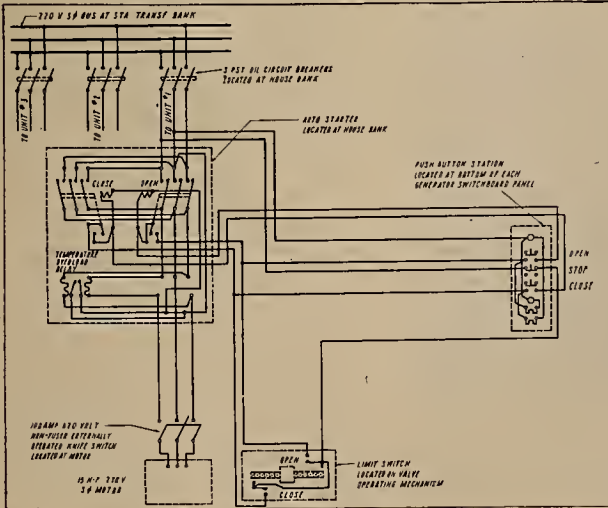


Fig. 5.—Wiring diagram for controlling emergency valve motors.

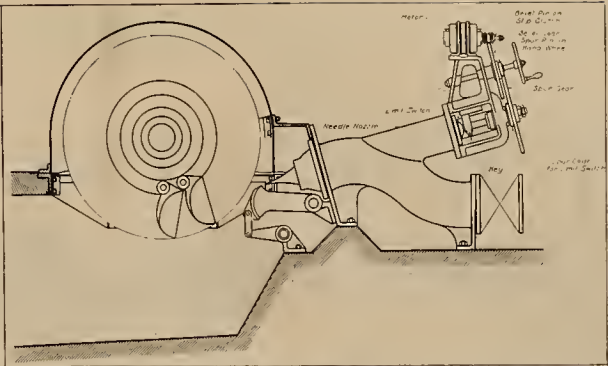


Fig. 6.—Motor-operated needle valves for automatically regulating quantity of water in jets to correspond to supply in ditch.

strung overhead but they are considered to be not so dependable. Circuits and switches should be schemed so that crossed or broken conductors cannot energize the motors or cause a mechanism to operate. No other service should be connected to the circuits intended for gate valve operation.

Auxiliaries—Motors are usually used to supply the mechanical energy although solenoids and other devices may also be employed. A manually operated mechanism is essential in all cases. It preferably should be permanently attached to the valve, but disengaged when not needed. Limit switches are important factors in the successful performance of remote control systems hence they should be substantially constructed. They should be adjustable not only for the original setting but also to compensate for wear which introduces lost motion.

To prevent damage to the mechanism should the limit switch fail to stop the motor, there should be a mechanical protection such as a friction disc drive which can slip when the torque becomes excessive. These discs are usually made of fibre and are mounted on the pinion shaft together with the adjusting spring. Temperature-actuated overload protective devices should have preference over those of the current type. If the mechanism has a tendency to coast after power has been cut off it will be found that a solenoid operated brake should be applied. As an alternative to this, the limit switch may be set to open in advance, permitting the mechanism to coast after which the hand control could be brought into action to move the valve into the exact position.

Mechanical and electrical interlocks should be employed wherever needed to make an installation "fool-proof." In this connection, it has been suggested that the control wiring for upper penstock valves should be connected through a pressure operated switch in such a manner that it would be impossible to open the valve until normal pressure exists in the penstock.

Before concluding, it should be stated that this paper has only aimed to describe several installations and to indicate some of the more important established rules of practice, and it is hoped that a free discussion will bring forth descriptions of other installations differing somewhat in type from those given and also other rules of value to those who are striving for the best ideas in the design of hydroelectric developments.

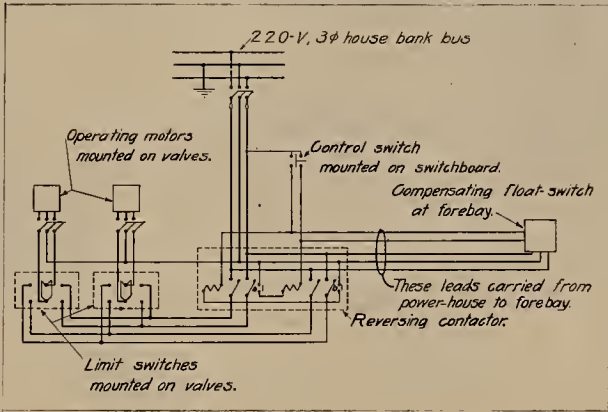


Fig. 7.—Wiring diagram for needle nozzle control.

INDUSTRIAL NEWS



Declare Fishing Rights Have Priority Over Power Government Fisheries Representative States Priest Rapids Project Must First Provide for Fish Migration

That the federal government must recognize the rights of the fishing interests as prior to those of the applicants for power developments on the Columbia River was the declaration made by Henry J. O'Malley of the United States Bureau of Fisheries at a public hearing held in Seattle, Wash., on May 14. The conference was called to consider the application of the Washington Irrigation & Development Company for a permit to construct a 90-ft. dam at Priest Rapids. The hearing was attended by representatives from the State Fish Commissions of Washington and Oregon, from the University of Washington and from the large power companies of the Northwest. One hundred and fifty representatives of the salmon fishing and packing industry were also in attendance.

Evidencing a spirit of complete harmony, the fishing and power interests made a genuine effort to solve the impending problem of getting salmon over the 90-ft. dam to the spawning grounds in the upper Columbia. That conclusive proof a fishway could be built that would permit salmon to pass over the proposed dam will be required before the Federal Power Commission will grant a license to the applicant was the opinion advanced by Mr. O'Malley. He also stated that, as far as the Bureau of Fisheries knew, no fishway has been erected that solves the problem of taking salmon over a dam more than 40 ft. high.

The fishery interests contended that the proposed dam, by shutting off three-fifths of the spawning area, would damage the fishing industry of the Columbia River unless adequate provision was made at the dam for the salmon to make their way over it in their course to and from the upper river spawning grounds. They showed that the annual yield of the fish products from the Columbia River was \$25 a surface acre, the equivalent of good agricultural land, and totaled \$10,000,000.

C. E. Magnusson, dean of the College of Engineering of the University of Washington, suggested the use of elevators or escalators to take the salmon over the dam, and this suggestion was endorsed as a possible solution to the problem by M. O. Leighton of Washington, D. C., engineer for the Washington Irrigation & Development Company, who has been working with other engineers on the project for some months. John N. Cobb, dean of the College of Fisheries of the university, told of experiments that were being prepared at the university laboratories

to pass young salmon through a modern type turbine to determine whether or not it would be safe to rely on this method of permitting the fish to return down stream after spawning. He also suggested that model ladders and escalators be installed at the Long Lake dam of The Washington Water Power Company in eastern Washington for experimental purposes.

Henry J. Pierce of Seattle, Wash., president of the Washington Irrigation & Development Company, stated that his company had purchased the 6,000 acres of land that will be flooded by the backwater behind the dam, and, in addition, 12,000 acres adjoining Priest Rapids for the site of an industrial city to be built there. He said that the ultimate investment involved in the project would be \$100,000,000. The project plans the development of 400,000 hp. the year round, primarily for industrial uses, and an additional 250,000 hp. during the spring and summer and fall months, when the river is high, for irrigation purposes. He further stated that the utilization of 250,000 hp. is already contracted for, and that the company is negotiating with interests that will establish an aluminum plant to produce 20,000 tons of aluminum annually from eastern Washington clay. This plant will have a demand of 100,000 hp.

At the close of the Priest Rapids hearing, Chairman Sims was authorized to name a committee composed of one representative each from Washington, Oregon, the federal government, the University of Washington, and the fishing interests, to negotiate further in an attempt to solve the fishway problem.

Protest Against Dams on Baker River.—Proposed development of power sites on the Baker River in Skagit County, Wash., by the Puget Sound Power & Light Company, has been protested by Dennis Winn of the Federal Bureau of Fisheries. The company has filed on two sites on the river, one at Concrete in the Baker River canyon and the other about five miles below Baker Lake on the same river. The first unit was to be installed at Concrete with a capacity of about 45,000 hp. at an estimated cost of \$500,000. The fisheries protest declared that the Concrete dam, 235 ft. in height, would totally destroy the Baker River and its tributaries as a spawning ground for chinook, sockeye, silver and steelhead salmon, as no fish ladder could be constructed which would raise salmon a greater height than 40 or 50 ft. at the most.

Municipal Ownership Sanctioned by Colorado Springs

With the heaviest vote ever cast in a special election involving a bond issue, Colorado Springs, Colo., voted on May 20 to issue \$1,250,000 in bonds to erect, purchase or equip a municipal light and power plant in that city. In the election 3,178 persons voted for the bonds and 2,294 against them, thus giving the bond issue a majority of 884. Since Sept. 8, 1923, the Colorado Springs Light, Heat & Power Company has been operating without a franchise, as the voters of the city refused to grant an extension of the Jackson franchise at an election held about a year ago.

The fight over the bond issue just passed has been a bitter one, and toward the end the municipal ownership issue itself was lost sight of and it became more a question of politics and personalities, according to reports from the Colorado city. It is not known whether the city will build its own plant or try to purchase the Colorado Springs Light, Heat & Power Company properties.

Eleven Prizes to Be Given for June Bride Windows

Prizes aggregating \$100 have been announced by the California Electrical Cooperative Campaign as awards in connection with the June Bride electrical appliance week, June 2-7. The prizes will be given to the eleven dealers in the state who present pictures of the best window displays presented during the week in connection with the June Bride campaign.

Material for trimming the windows has been sent either directly to the dealers or to the power company office in the dealer's city from which place the dealer can secure it. The window trim material includes posters suggesting "Electrical Gifts for June Brides" and a series of banners calling attention to the value of electrical appliances.

First prize to be given for the best decorated window will be \$25, the other prizes will be five \$10 prizes and five \$5 prizes. Each dealer who enters a picture in the contest and who does not win a prize will be paid \$1.50 to reimburse him for the cost of the picture. Pictures of windows displayed in the campaign must be mailed to the California Electrical Cooperative Campaign not later than June 7. The prize-winning pictures will be run in an early issue of the Journal of Electricity.

Improvements Planned for Great Northern Railroad Telegraph Lines.—The Great Northern Railroad plans to expend approximately \$175,000 in improvements to its telegraph lines between the Montana-North Dakota line and Wenatchee, Wash.

California Power Situation Shows Improvement

Expect Another Critical Period in Late Summer and Early Fall

When Dependence Will Be Made on Storage

The power situation in California has been considerably improved in the last two months due principally to a rather heavy rainfall in the latter part of March. All seriousness has not been removed from the situation, however, as another critical period will be faced during the late summer and early fall.

A period of possible power shortage will be faced during July, August, September and October, after the early run-off has taken place and storage water must be depended upon. By that time, however, 32,500 kw. of new steam capacity will be available. Four new units, aggregating 20,000 kw., will be in operation in the Long Beach plant of the Southern California Edison Company during July, and the steam turbine unit of 12,500-kw. capacity on the Pacific Gas and Electric system at Sacramento will be in operation by July 1. Besides this there will probably be available 6,500 kw. of hydroelectric power which the San Joaquin Light & Power Corporation has contracted to purchase from the Turlock Irrigation District and the output of an additional 25,000 kw. hydraulic unit placed in operation April 1, by the Great Western Power Company at its Caribou plant on the American River.

The problem in southern California will be largely one of supplying kilowatt-hours while in the northern part of the state it will be a question of peak load capacity. With the fullest conservation of all available energy, it is hoped that no curtailment of the use of power will be necessary during the coming few months. The engineering department of the California Railroad Commission has offered its services to the power companies and several conferences have already been held where the fullest spirit of cooperation was manifested.

The trying situation just passed through was brought about by the most serious drought southern California has witnessed in forty years. The northern part of the state has also suffered from lack of rain and snowfall. As a result of the protracted dry spell in southern California, the irrigation load during January and February created a total output on the system of the Southern California Edison Company approximately 40 per cent greater than that of the same months of the previous year. Coupled with this, the lack of rainfall failed to add the customary generating capacity formerly derived from the stream-flow plants, with the result that an acute situation was created, due to the heavy draft on storage water. Complete depletion of storage water was only averted on the system of the Southern California Edison Company by the utilization of every available source of energy. Even small isolated plants which had been abandoned and larger plants which were obsolete were pressed into service.

Interconnection with other companies made it possible to use the surplus steam capacity of such companies, and the cooperation and assistance received in this way was of the utmost value. The advantages and the flexibility of the extensive interconnected system in California were thus demonstrated. As

might often occur, a shortage due to trouble or lack of capacity for some reason on one system which might otherwise compel a curtailment has been partially met by obtaining energy from other companies. During the recent shortage the Southern California Edison Company received 20,000 kw. from the San Joaquin Light & Power Corporation; 16,000 kw. from the Los Angeles Gas & Electric Company; 4,500 kw. from the San Diego Consolidated Gas & Electric Corporation; 2,000 kw. from the City of Pasadena, and 5,000 kw. from the Pacific Gas and Electric Company.

The Southern Sierras Power Company, Riverside, Calif., also experienced a shortage of water power and through the frequency changer installations at Colton and San Bernardino the Southern California Edison Company was able to supply this company with some energy and thus avoid serious curtailment on that system.

In addition to energy received from other operating companies, numerous consumer's isolated plants were rehabilitated, connected to the Edison system and operated by that organization. Seven isolated plants with a combined capacity of 5,850 kw. were placed in operation. A difficult problem was overcome in the case of one of these plants. The Vineyard plant of the Pacific Electric Railway Company, of 3,000-kw. capacity, had been idle for eleven years and parts of the equipment had been removed. In spite of this the Edison organization restored the plant to service in the remarkably short period of seventeen days. The restoring of many of these plants to service involved in some cases re-tubing of boilers, restoration of fire brick, cleaning and repairing of condensers, overhauling of electrical apparatus, installation of transformers, switches, synchronizing apparatus, and other facilities in order that the plants might be operated in parallel with the power company's system.

Although some apprehension was felt in the northern half of the state, the situation was not nearly so critical as that in southern California. Only a fraction of normal precipitation exists

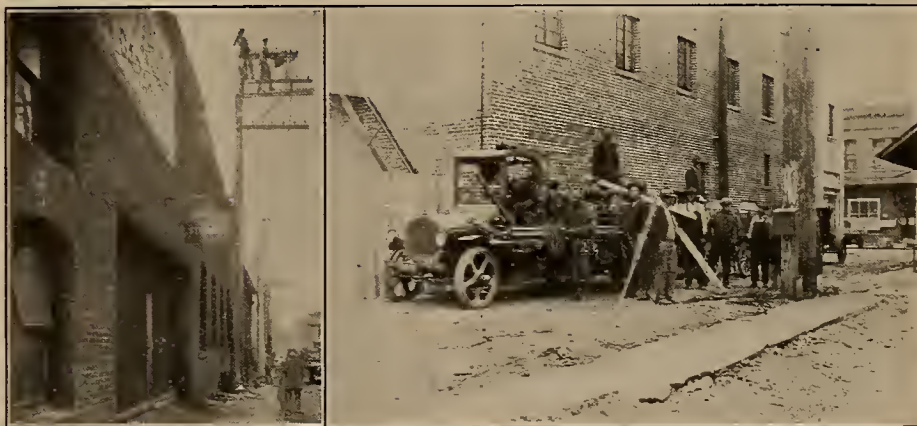
in the Sierra Nevada Mountains, but notwithstanding this fact a greater proportion of normal storage water will be available than in the southern part of the state. The large steam reserve of the Pacific Gas and Electric Company, together with a new 12,500-kw. steam turbine in the Sacramento plant which will be in operation by July 1, will help materially.

Committee Refuses to Report Ford Bill to Senate

By a vote of 10 to 6, the Senate Committee on Agriculture on May 21 refused to allow the bill embodying Henry Ford's offer for the Muscle Shoals properties of the government to go on the Senate calendar, even with an unfavorable report. No motion proposing to report the Ford bill favorably was made at this session of the committee. Had such a motion been made it probably would have been supported by not to exceed four votes. The objective of the proponents of the Ford bill at this hearing was to get the measure on the Senate calendar. They recognized that a favorable report could not be obtained.

On failing to get the Ford bill out of the committee, even with an unfavorable report, it then was moved to report Chairman Norris' government-control bill. This would have been of advantage to the Ford supporters, as the passage by the Senate of this substitute for the Ford bill would have thrown the legislation into conference. In this way many of the features of the Ford bill could be embodied in the conferees' bill. This proposal, however, was voted down 11 to 6. A motion to close the hearings immediately was lost overwhelmingly, but by a vote of 10 to 6 the committee agreed to close the public hearings on May 26 and to consider, in executive session, on the day following such final action as the committee may take.

The majority of the committee, it is believed, feels that in view of the government's \$200,000,000 investment at Muscle Shoals the best course to pursue is government operation of the dam and its power house. In that connection, it has been suggested that contracts for power, for a time at least, be for relatively short periods until actual operation may have demonstrated the terms and conditions under which the public's interest will be served best.



Over a period of fourteen months line crews of the San Joaquin Light & Power Corporation have been rebuilding many of the distribution lines of the company, to conform with the California Railroad Commission General Order No. 64. Wing-arm type of construction is being installed to insure more adequate service and to secure greater safety to those engaged in working on the lines. Longer and heavier poles are also being placed.

Association Opens Campaign to Defeat Bone Bill

Unique Pamphlet Presents Arguments Showing Why Washington Public Ownership Measure Should Be Rejected

Power and light companies of the Northwest have opened a campaign to defeat the passage of the proposed "Bone Power Bill," which, if the efforts of the so-called Washington Superpower League to obtain sufficient signatures to the petition are successful, will appear on the ballot in the Washington general election, Nov. 4, 1924, as Initiative Measure No. 52. The text of the proposed measure follows.

"AN ACT

"Authorizing cities and towns to use, purchase, sell and dispose of electric current inside or outside their corporate limits; to acquire, construct, maintain and operate inter-tie lines, transmission lines and distribution systems; and to exercise the right of eminent domain in aid of the acquisition, construction, repair, operation, extension or betterment of any plant or system for generating, transmitting or distributing electricity.

"BE IT ENACTED BY THE PEOPLE OF THE STATE OF WASHINGTON:

"Section 1. Any city or town shall have the right to sell and dispose of electric current to any other city or town, governmental agency or municipal corporation, or to any person, firm or corporation, inside or outside its corporate limits, and to purchase electric current therefrom. No such purchase or sale of electric current shall subject or make liable any city or town, or any other purchaser or seller of such electric current, to any tax on account of such purchase or sale.

"Section 2. Any city or town is hereby authorized to acquire, construct, purchase, condemn and purchase, own, operate, control, add to and maintain, electric generating plants, lands, easements, rights, rights-of-way, franchises, distribution systems, substations, inter-tie or transmission lines, to enable it to use, purchase, sell and dispose of electric current inside or outside its corporate limits, or to connect its plant with any other electric plant or system, or to connect parts of its own electric system.

"Section 3. Whenever in aid of the work of construction, repair, operation, extension or betterment of any electric plant or system of any city or town, or in aid of the work of logging or clearing a reservoir or impounding site therefor, the owner, lessee or operator of any railroad not a common carrier, shall refuse, for a reasonable consideration to be mutually agreed upon, to transport any materials, machinery, equipment, logs, timber products, supplies or labor, to or from the place or places on said railroad nearest or most convenient to the point or points where such work of construction, repair, operation, extension or betterment, or such work of clearing or logging in such reservoir or impounding site, is being done or performed; or whenever the owner, lessee or operator of any booming, rafting or sorting works, shall refuse, for a reasonable consideration to be mutually agreed upon, to boom, raft or sort, any logs, or lumber products, removed or to be removed by or under

the direction of such city or town, from any lands used in such work, then and in that event such city or town shall be and is hereby empowered to acquire by condemnation, the right to use and damage such railroad, and sufficient of its equipment, and such booming, rafting or sorting works, for such time as shall be deemed reasonably necessary by such city or town to accomplish such work, after just compensation has been first made or paid into court for such owner, operator or lessee.

"Section 4. Any city or town is hereby authorized to exercise the power of eminent domain hereby granted, under the same provisions and procedure as is or shall be provided by law for the condemnation of private property for any of the corporate uses or purposes of such city or town. In exercising the power of eminent domain for the public purposes herein enumerated or specified, by such city or town, it shall not be a defense or an objection thereto that a portion of the electric current generated or sold by such city or town will be applied to private purposes, provided the principal uses intended are public.

"Section 5. Nothing in this act shall authorize or entitle any city or town to acquire by eminent domain any electric plant or any part of such utility now or hereafter owned by any other city, town or municipal corporation.

"Section 6. If any part of this act shall be adjudged to be invalid or unconstitutional, such adjudication of invalidity or unconstitutionality shall not affect the validity or constitutionality of the act as a whole, or of any part thereof not adjudged invalid or unconstitutional. The provisions of this act shall be cumulative, and nothing herein contained shall abridge or limit the powers of cities or towns under existing laws."

In a unique pamphlet prepared and distributed by the Northwest Electric Light and Power Association, the probable effects of this measure are discussed. Quoting from the pamphlet:

"The Washington State Superpower League is planning to put over two power measures. They were drawn by Homer T. Bone, Oliver T. Erickson and Seattle public ownership advocates.

"The Bone Bill is avowedly the first step in this program (the ultimate ownership by the municipalities of the state of all the properties of the private power companies). Under pretense of merely permitting cities owning municipal plants to sell their current outside the city limits, the Bone Bill embodies the vital principles of the Erickson scheme. In order to permit cities to take over the light and power properties of existing companies, Mr. Bone has added Sections 2 and 4 to the bill introduced by him in the Legislature."

Discussing the effect of the proposed bill on taxes, the pamphlet says:

"The electric light and power properties in the State of Washington are now paying over \$5,000 a day—over two million dollars a year—in taxes.

"Unless prevented by these proposed bills, they will spend, within the next ten years, over one hundred and twenty-five million dollars in extending their

plants and service to communities not now receiving electric energy. All under state regulation. Every dollar of this money will go upon the tax rolls to lighten your burden of taxation."

The pamphlet then goes on to show that the removal from the tax rolls of the present properties of the private companies by the purchase of them by municipalities, will increase the tax burden generally over the entire state.

In discussing the bill's effect on electric rates, the pamphlet has this to say:

"Proponents of the Bone-Erickson bills would bond the state for approximately three hundred million dollars, would take all electric light and power properties off the tax rolls and turn them over to political management and operation, all upon vague and indefinite promises of reducing the price of the cheapest item upon the family budget."

In attacking the claim of the municipal ownership proponents that rates in Seattle have been forced down by the municipal plant, the pamphlet makes the following comparison of electric bills in different cities, in the case of the average monthly consumption of 36 kw-hr. for household use:

"Seattle

36 kw-hr. @ 5½c.....\$1.98

Spokane

First 20 kw-hr. @ 7c.....\$1.40

Next 16 kw-hr. @ 3c..... .48

His bill in Portland would be \$1.97. Rates are practically the same in all three cities, although neither Spokane nor Portland has a municipal plant."

Calling attention to the fact that municipal operation of public utilities is unregulated, and showing the possible effects of this lack of regulation on outlying districts, the pamphlet continues:

"Municipal plants are exempt from regulation. As originally drafted, the Bone Bill merely gave municipalities the right to sell electric energy outside their city limits, and the claim was vigorously made that its purpose was to enable them to compete with the private companies in outside territory. With the addition of the Erickson features as contained in Sections 2 and 4, they would be empowered to either purchase or condemn all existing light and power properties in this outside territory so as to obtain exclusive control of the business. When this is accomplished, these cities will absolutely dictate the rates for all outlying cities and communities."

Quoting further from the pamphlet, reasons are given,

"Why the Taxpayers Should Look This 'Gift Horse' in the Mouth.—The Bone-Erickson 'free' power bill is traveling under a fraudulent label. The only thing 'free' about it is the power of the political machine to dip into the taxpayer's pocket-book. Nor does this bill contain any assurance of 'cheap power' to anybody.

Cheap power results from well conceived projects, wisely and economically developed and efficiently administered. Inaccurate engineering estimates, over-ambitious schemes and extravagant political management will inevitably result in higher, not lower, rates."

Farther along the pamphlet makes this comprehensive observation:

"Initiative Measure No. 52, the so-called Bone Bill, does not contain one single provision which insures in the slightest degree the conservation of the

water powers of the state in the interests of the people of the state. Its purpose is to allow Seattle and Tacoma to still further extend their experiments in municipal ownership—to use still more of the state's waters without compensation—to obtain an unregulated monopoly of the light and power business—to issue more tax exempt bonds—to create still more tax exempt property, and to still further increase the tax burden."

It concludes by advising its readers to—

"Read the Bone Bill. Study its provisions carefully, with particular reference to its effect upon your taxes when the present tax-paying properties are removed from the tax rolls."

Puget Sound Property Seized in Tax Payment Battle

Seizure of over two million dollars' worth of personal property of the Puget Sound Power & Light Company in Seattle, Wash., was made by Matt Starwich, sheriff of King County, on May 23. Notice of distraint and sale was served upon officials of the company, to secure the payment of over six hundred and fifty thousand dollars in taxes and interest accruing from the 1919 tax on the Seattle street railway, which was sold to the City of Seattle on April 1, 1919. Simultaneously with the serving of the notice of seizure on A. W. Leonard, president of the company, deputies posted notices of sheriff's sale, dated June 10, on the property distrained.

In an effort to stay confiscation and sale of the property by the King County sheriff, the Puget Sound Power & Light Company filed suit in the Federal court of equity, asking for a temporary restraining injunction until after a hearing on May 28. The suit charges the city and county officials with being fraudulent and oppressive. No action on this suit had been taken up to the time of going to press.

The King County sheriff seized the property on the order of Wm. W. Shields, treasurer of the county, who is demanding the payment of the 1919 taxes, together with the interest on them since March 15, 1920. The original amount of the tax bill was slightly over \$400,000 and this, together with the interest at 15 per cent per annum makes the total amount demanded.

The city bought the present municipal railway system from the company in 1919 under an agreement that if the courts held assessments for that year valid, the city would pay three-fourths and the company one-fourth of the tax. The courts have since so held and the city, according to newspaper reports, has refused to pay any part of the tax, contending that municipally owned properties are not subject to taxation.

The question of liability for the 1919 tax, so far as the county is concerned, has been fought through to the United States Supreme Court and the county officials claim that the courts have invariably held that the county can collect from the company, regardless of any agreement as to tax payment that was included in the sale contract between the company and the city.

Following the recent decision of the United States Supreme Court upholding the contention of the county, the Puget Sound Power & Light Company offered to remit its share of the 1919 taxes to

the King County treasurer who has refused this payment on the ground that he cannot lawfully accept only a portion of the tax. Corporation Counsel Thomas J. L. Kennedy has reported to the Seattle city council that the council cannot legally draw upon the general funds or the city railway funds to make up its share of the tax payment.

According to J. N. Howe, counsel for Puget Sound Power & Light Company, the city admits making contract to pay three-fourths of the taxes and by its ordinance, described the form of contract with such provisions. The Supreme Court decided that the contract, as prescribed, was valid and that when the city claimed the property was exempt from taxation it took the property subject to taxes and that the property was not exempt. The city now for the first time denies liability, claiming it could not make such promise and refuses to pay.

Tunnel Construction Started by Los Angeles Railway

Construction work on a double track tunnel to be 4225 ft. long has been started by the Pacific Electric Railway of Los Angeles, Calif. The new tunnel will provide a more direct route for the Pacific Electric Railway cars from the business district of Los Angeles to Hollywood and will also avoid running the cars through the congested streets of the city. The total cost of the project is to be about three and one-half million dollars. Contract for driving the tunnel has been awarded to Twohy Brothers.

The downtown end of the tunnel is in the railway company's present Hill Street terminal and in going through the hill the tunnel will curve to the north so as to come out at Glendale Boulevard and First Street. The tunnel is to take more than 1,000 trains per day from the congested streets of the business district, providing them with a shorter route over which they can operate at a speed of 30 to 35 m.p.h. to a connection with the Glendale Boulevard lines of the company, whence comparatively good time can be made to Hollywood, Glendale and other outlying portions of the city.

The tunnel is to be lined with concrete and will have an inside width of 28 ft. and will have approach cuts 300 and 500 ft. long. Construction work on the tunnel is to be completed within eighteen months.

Campaign for Bone Power Bill Is Opened in Seattle

With Homer T. Bone of Tacoma, Wash., Farmer-Labor member of the State Legislature of Washington, and author of the Bone Power Bill, heading the movement, the campaign for the Bone Bill has been opened in Seattle. A conference and mass meeting held recently was addressed by J. D. Ross, superintendent of lighting in Seattle and chairman of the campaign committee.

The Central Labor Council, backing the bill, has asked the unions affiliated with the Council to aid in support of the measure by donations of from \$10 to \$25 to aid in the drive for signatures to the petitions now in circulation. The King County Democratic Club has announced that it is standing 100 per cent behind the Bone Bill.

Ishi Pishi Permits Are Granted by California Board

Six permits for water for power development on California rivers were issued during April by the Division of Water Rights of the California Department of Public Works. Five of these cover major projects.

Two of the permits are for the Ishi Pishi project of the Electro Metals Company, San Francisco, on the Klamath River in Humboldt County. The first grants to the company 3,075 sec.-ft. of water to develop 32,727 hp., and the second grants 3,000 sec.-ft. and 89,655 acre-feet per annum for the development of 103,295 hp. The estimated cost of the latter project is given as \$8,000,000. These permits constitute the second step in the progress of this development, the first being the granting last July to the company of the certificate of diligence, which is involved in litigation by the State Fish and Game Commission, which claims that the development will be a menace to the fish in the river. Bearing on this matter is the report that an initiative petition is to be circulated to create a law prohibiting all power projects on the Klamath River.

A third permit for power on the Klamath River in Humboldt County was that issued to H. L. Jackman, Eureka, for 9,000 sec.-ft. for developing 92,045 hp. The estimated cost of this project is placed at \$9,000,000.

Other permits issued were those to the Turlock Irrigation District, Turlock, for 1,725 sec.-ft. of water from the Tuolumne River, Stanislaus County, for 22,543 hp.; to the Modesto Irrigation District, Modesto, for utilizing 1,500 sec.-ft. of water from the Tuolumne River, Stanislaus County, for developing 19,210 hp.; and to the Mt. Shasta Power Corporation, San Francisco, for 25 sec.-ft. from Rock Creek, Shasta County, to be used in developing 889 hp.

During the same month four applications for development of hydroelectric power were received by the department as follows: from the Little Rock Power & Water Company, Los Angeles, for 50 sec.-ft. and 7,547 acre-feet of water from Little Rock Creek, Los Angeles County, to develop 6,081 hp.; two from E. B. Perrin, Los Angeles, one for 50 sec.-ft. and 12,000 acre-feet to develop 5,823 hp., and the other for 150 sec.-ft. and 20,000 acre-feet to develop 27,272 hp., both from Thoms Creek, Tehama County; and from the Bear River Power Company, Auburn, for 250 sec.-ft. and 100,000 acre-feet of water from Bear River to develop 42,994 hp.

San Joaquin Company Publishes History in Year Book

The San Joaquin Light & Power Corporation, Fresno, Calif., has recently published its Year Book for 1923. The booklet, which is presented in a most attractive form, contains a history of the San Joaquin company, giving in a brief way the important points in the company's growth since 1896, when the first hydroelectric plant was constructed by the company's engineers on the San Joaquin River.

Illustrations showing both interior and exterior of the new San Joaquin building in Fresno accompany editorial matter describing the building in detail.

Meetings

Tentative P. C. E. A Convention Program Is Announced

The tentative program for the eighth annual convention of the Pacific Coast Electrical Association, to be held at Coronado, Calif., June 16-20, has been announced. The feature of the convention will be the Public Service Conference to be held on the afternoon of June 20. R. H. Ballard, vice-president and general manager of the Southern California Edison Company, will preside at the conference.

Information concerning hotel accommodations at Coronado, Calif., has been sent to all members of the Pacific Coast Electrical Association by Alfred May, chairman of the hotel committee. Rates for both the Hotel del Coronado and Coronado tent city are included in the information sent to the members of the association, together with a return postcard permitting the members to inform the hotel committee what space they desire to have reserved for them.

The personnel of the convention committee, as well as of the regular committees of the association, have been announced in the last issue of the *Electrifier*. The tentative program for the convention is as follows:

Monday, June 16

Afternoon

Registration.

Evening

Informal dancing and entertainment.

Tuesday, June 17

Morning

8:00 a.m. to 9:45 a.m.—

Registration.

10:00 a.m.—
General business meetings.
Address of Welcome.
President's report.
General Committee reports.
Report of the Nominating Committee.
Election of Officers.

12:00 Noon.—

Luncheon.

Under the auspices of The Electric Club of San Diego the electric clubs of California will provide a special program for the delegates and guests attending the convention.

Afternoon

2:00 p.m. to 5:30 p.m.—

Business sessions of the Commercial, Technical, Purchasing and Stores Sections.
Reports, papers and discussions.

Evening

9:00 p.m. to 9:30 p.m.—

Reception to President and executive officials of the Association.

9:30 p.m.—

Dancing.

Wednesday, June 18

Morning

9:30 a.m. to 12 M.—

Business sessions of Commercial, Technical, Purchasing and Stores, Accounting and Publicity Sections.

10:00 a.m. to 12 M.—

Meeting of women delegates under the auspices of the Women's Affairs Section of the Public Relations Committee—Miss J. Frances Emans, presiding.

Afternoon

2:00 p.m. to 5:30 p.m.—

Business sessions of Commercial, Technical, Purchasing and Stores, Accounting, Publicity and Personnel Sections.

Thursday, June 19

Morning

9:00 a.m. to 12 M.—

Business sessions of Commercial, Technical, Publicity, Purchasing and Stores Sections.

9:00 a.m. to 10:00 a.m.—

Meeting of the Executive Committee.

10:00 a.m. to 12 M.—

Special session of the Public Relations Section.

Afternoon

1:00 p.m.—

Sports Committee will provide delegates with an opportunity to enjoy competition in golf, tennis and swimming. Special prizes for all events. All entrants to these various events must register with the Sports Committee.

Evening

9:00 p.m.—

Grand Ball (formal) with special features; ballroom Hotel del Coronado.

Friday, June 20

Morning

10:00 a.m.—

General business session and conference addressed by national representatives. Transaction of all unfinished business.

12 Noon.—

Convention photograph.

Afternoon

2:00 p.m.—

Public Service Conference, R. H. Ballard, presiding.

Addresses by representatives of the important public service companies in California, including power generation, transportation, communication and other allied industries.

Evening

7:00 p.m. to 9:30 p.m.—

Convention Banquet, main dining room, Hotel del Coronado; A. Emory Wishon, toastmaster.

10:00 p.m.—Convention Carnival.

Jobbers to Hold July Meeting at Del Monte, Calif.

The next quarterly meeting of the Pacific Coast Electrical Supply Jobbers' Association will be held at Del Monte, Calif., July 24 to 26. The meeting was originally scheduled for June 12 to 14, and was to have been held at Coronado.

Closed meetings will be held on July 24 and 25, and the customary open meeting will be held on the morning of July 26.

COMING EVENTS

American Association of Engineers—

San Francisco, Calif.
June 11-13, 1924

Pacific Coast Electrical Supply Jobbers' Association—

Quarterly Meeting—Del Monte, Calif.
July 24-26, 1924

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—

Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association

Annual Convention—Gearhart, Ore.
June 25-27, 1924

Lakeside Plant Will Not Be Ready Until Nov. 1.—The Lakeside plant of the Public Service Company of Colorado will not be placed in operation before Nov. 1, 1924, according to recent announcements of the utility company. It was originally planned to place a \$12,000,000 power plant in operation about July 1 of this year, but delay in the arrival of machinery has held up the work so that it will not be possible to complete the project on the original date. The first unit, which is being constructed at the present time, will cost \$4,000,000 and is to have a capacity of approximately 20,000 kw. The plant is located at Boulder Lake, four miles east of Boulder, and transmission lines are being constructed to Denver and to northern Colorado points.

Seven Western Men Will Attend World Power Conference

Seven Western men have signified their intention of attending the World Power Conference, to be held in London, England, June 30-July 12, 1924. The program for the conference that is under the control of the American Committee has been announced and three papers will be presented by engineers living in the West.

The papers to be presented by the Western men are as follows:

"Regional Review for the Pacific Coast States," by A. H. Markwart, vice-president, Pacific Gas and Electric Company, and H. A. Barre, executive engineer, Southern California Edison Company; "Power Connected with Irrigation," by Henry J. Pierce, president, Washington Irrigation & Development Company, and E. C. Bebb, hydraulic engineer, Federal Power Commission; and a paper on "High Tension Transmission," by F. G. Baum, consulting engineer, San Francisco. Among the Western men that have intimated that they will attend the conference are: Prof. C. L. Cory, University of California, Berkeley; H. T. Cory, Palos Verdes Project, Redondo Beach, Calif.; W. A. Doble, chief engineer, Pelton Water Wheel Company, San Francisco; John B. Miller, president, Southern California Edison Company; R. A. Millikan, director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena; Robert Sibley, vice-president, American Society of Mechanical Engineers, Berkeley, Calif.; A. B. West, president, Southern Sierras Power Company, Riverside, Calif.

Telephone Operation Explained to San Diego Clubmen

"The Big Idea" in telephone operation was made the feature of the May 13 meeting of the San Diego (Calif.) Electric Club, held at the Point Loma Country Club. C. A. Stevens, of the telephone company, and chairman of the Better Telephone Company Cooperation committee of the Electric Club, was in charge of the program, given for the entertainment and instruction of the Electric Club members and their wives.

A demonstration switchboard showing both the manual and automatic switchboard operations was used as the basis for the program. Miss Dorothy McDonald, instructor of the operator's school, gave a description of the various stages of operation between the making of a phone call and its completion.

A short skit, "Ten Minutes from Broadway," depicting two married couples and their attempts to get each other over the telephone, making all the common mistakes for which service is usually blamed, concluded the program. The latter drew much comment as an excellent method of acquainting the public with some of the intricacies of telephone operation.

Radio Engineer Addresses Oakland Club.—Don Lippincott, radio engineer of the Magnavox Company of Oakland, Calif., and chairman of the educational committee of the Pacific Radio Trades Association, was the principal speaker at the May 19 meeting of the Electric Club of Oakland. Mr. Lippincott gave an interesting review of his experiences in radio work.

Manufacturer, Dealer and Jobber Activities

Century Electric Company, St. Louis, Mo., has published Bulletin No. 36, covering the Century line of a.c. and d.c. fans. The bulletin contains complete descriptions of the company's line of fans together with assembly diagrams of ceiling fans.

Automatic Electric Heater Company, Warren, Pa., is now manufacturing the Clark Selective Load Control, which is designed to provide a more even load factor for domestic installations where electric range and water heater are in use. The device is so designed that when the electric range is in use, the electric water heater is automatically cut off the line, staying off until such a time as the demand from other devices is lowered to a predetermined point.

The R. Thomas & Sons Company, East Liverpool, Ohio, has just issued an attractive folder on cemented type suspension units.

The Providence Insulated Wire Company, Providence, R. I., has taken over the insulated wire department of the Bourn Rubber Company of that city.

Apparatus is being installed in the million-volt test laboratory of the California Institute of Technology at Pasadena, Calif. Four 250,000-volt transformers, with a capacity of 1,000 kw., have arrived and are being set up. The laboratory, the first of its kind in the West, was made possible through the cooperation of the college and the Southern California Edison Company. The power company erected the building and the school is supplying the equipment. Dr. Robert A. Millikan will be in charge of the experimental work.

The General Electric Company line of oil-filled instrument transformers is being redesigned to allow the use of the same type of coil and winding now used in the distribution type of transformer. The new design will also include the interchangeable bushing now used in General Electric oil switches, distribution transformers and lightning arresters.

Moe-Bridges Company, Milwaukee, Wis., has appointed the B & R Electrical Supply Company of Denver, Colo., distributors of the line in the Rocky Mountain region.

The Electric Agencies Company, 56 Natoma Street, San Francisco, Calif., has moved to 655 Minna Street, that city, and will be located at the new address on and after May 1. B. A. Wagner, manager of the company, has just returned from an extensive trip to eastern factories.

The O. C. White Company, Worcester, Mass., has recently published two "Applied Illumination" folders that are designed to supplement the company's latest catalog. One of these is entitled "The Trend of Industrial Lighting" and is devoted to shop fixtures and shows new styles of 23D and 24D drafting-board fixtures. The other folder, on "The Factors of Lighting Efficiency," details the new 2LA conduit fixture and the new 3SA bench light. The folders can be obtained on application to the manufacturer.

The Westinghouse Electric & Manufacturing Company has recently issued a new 20-page publication, known as circular No. 1670 and entitled "Static Condensers for Power Factor Correction." In this circular the need for power factor correction and the methods of obtaining high power factor are discussed. The method of selecting the proper corrective device for power factor is carefully analyzed, and the fields of application of synchronic and static condensers set forth in diagrammatic form. A complete illustrated description of Westinghouse Type LD static condensers with wiring diagrams for two and three-phase equipment is included in the circular. The method of calculating the corrective kva. necessary for an installation of condensers and a chart for determining the per cent of reactive kva. required to raise the power factor to a desired value are next presented. A tabulation of the weights, dimensions and losses of static condensers and the weights and dimensions of transformers conclude the information given.

The Lovell Manufacturing Company, Erie, Pa., has recently placed on the market a new portable electric clothes wringer designed for use with washing machines not provided with power wringers and as an auxiliary in laundry equipment for homes, hotels, clubs, schools, etc. As the wringer is mounted on a tripod, it has a swivel hanging permitting it to be swung to any position over a washer or stationary tub. For permanent use on stationary tubs or boilers, the wringer is built without the stand and provided with clamps to hold it in place. Power for turning the rolls of the wringer is supplied by a Westinghouse heavy duty electric motor built for operation on either direct or alternating current at 110 volts.

Commercial Electric Company, San Francisco, has moved to 1925 Howard Street in that city.

Henry D. Sears, general sales agent for Webber wiring devices with offices in Boston, Mass., has recently issued a wall poster devoted to illustrations and descriptions of Staylit. The device is a lamp socket designed to keep a lamp lighted for a minute or two after the cord controlling it has been pulled.

Birkel & LeGassick, wholesale electric supply company, is developing a large business at Santa Monica, Calif. The company is located at 702 Santa Monica Blvd.

Harvey Hubbell, Inc., Bridgeport, Conn., has recently placed on the market a new toggle switch. The company has also announced a line of 10 and 20-amp. polarized shallow flush receptacles which have been re-designed to fit standard convenience outlet face plates. The receptacles are only 1-3/32 in. deep and are therefore suitable for thin partitions.

Atlantic-Pacific Agencies Corporation, San Francisco, has established sales agencies in Chicago, Philadelphia, Pittsburgh, Boston, New York City, St. Louis and Dallas, Texas.

The American Airdry Corporation has recently moved its head offices and factory from Groton, N. Y., to Chicago, Ill. The company manufactures Airdry, "The Electric Towel," and has moved to Chicago to secure a more centrally located distributing point. Pacific Coast representation for the company remains the same and is in charge of the Airdry Electric Service Company, with headquarters in the Rialto Bldg., San Francisco.

The Electric Outlet Company, Inc., New York, N. Y., has brought out a new product which will be called "wire-nuts." The new device is made of brass and Bakelite and is for use in making wire joints in outlet boxes and elsewhere.

Curtis Lighting, Inc., has moved its Los Angeles office from the Pacific Finance Building to 1040 Merchants National Bank Building in the same city. The company has recently opened a lighting studio at the new address.

The F. W. Wakefield Brass Company, Vermillion, Ohio, Ivanhoe Works of The Miller Company, Cleveland, and the National Lamp Works of the General Electric Company, are issuing a new booklet entitled "A Central Station Campaign that Sold 2,609 Store Lighting Units in 10 Days." The book tells of the experience of the Ohio Public Service Company in making 2,609 sales to 6,370 stores in seven medium-sized cities, and is designed to show other central stations and contractors how such a campaign should be conducted and as to the results that can be obtained. The information concerning the mapping out of such a better store lighting campaign is exceedingly well written and should be of value to anyone considering the possibilities of such a sales drive. Copies of the book may be obtained free of charge from any of the three manufacturers cooperating in its publication.



Gearhart Hotel, Gearhart-by-the-Sea, Ore., where the annual convention of the Northwest Electric Light and Power Association will be held, June 25-27, 1924. This hotel is reported to be the best equipped beach hostelry in the Northwest.

Personals

Franklin T. Griffith, president of the Portland Electric Power Company, Portland, Ore., has been elected president of the National Electric Light Association. Mr. Griffith is a prominent figure



FRANKLIN T. GRIFFITH

in the electrical industry in the West. In addition to his activities with the Portland Electric Power Company, which, under his direction, has shown marked progress in the relation of the utility to the consumer and in the improvement of public relations, he has been greatly interested in the subject of water power and its proper conservation and use. He was for two years chairman of the Water Power Development Committee of the National Electric Light Association, and during that time devoted much attention to the matter of the formation of the Federal Power Commission. Mr. Griffith has also been active in the interests of the Northwest Electric Light and Power Association, having served as its president at one time, in addition to acting on various committees. The new president of the National Electric Light Association was born in Minneapolis in 1870. His boyhood was spent in Oakland, Calif., where he received his education. He was admitted to the bar in Oregon in 1894, later becoming attorney for the Portland Railway, Light & Power Company, now the Portland Electric Power Company. He was elected president of that company in 1913. Mr. Griffith has been vice-president of the National Electric Light Association since the early part of 1924, having been appointed to that position to succeed the late John A. Britton. Mr. Griffith's familiarity with the affairs of the Association and his grasp of conditions in the electrical industry as a whole make him particularly fitted for his new post. P. S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., has been elected fourth vice-president of the National Electric Light Association, and W. A. Jones of the Henry L. Doherty Company, New York, N. Y., treasurer.

Farley Osgood, vice-president and general manager of the Public Service Electric Company, Newark, N. J., has just been elected president of the American Institute of Electrical Engineers.

J. H. Surclaw, a director of the Canadian National Railways of New Glasgow, Nova Scotia, was a recent Los Angeles, Calif., visitor.

C. V. Schneider, of the Electrical Supply Company, Sacramento, Calif., recently made a business trip to San Francisco.

E. V. Rosenbaum, consulting engineer in the employ of the Federal Light & Traction Company of New York, has arrived in Aberdeen, Wash., to superintend the installation of the new power house equipment purchased by the Grays Harbor Railway & Light Company, at a cost of \$500,000. Mr. Rosenbaum will be in Aberdeen for about nine months. He recently finished superintendence of a million dollar plant which the Federal Light & Traction Company has installed at Springfield, Mo. His work in Aberdeen will include supervision of the new power house equipment, which includes an 8,000-hp. turbine, boilers, fuel containers and conveyors, switchboards and substations.

A. S. Moody, for the past year manager of the Los Angeles, Calif., office of the General Electric Company, has been made Northwest manager of that company with headquarters at Portland, Ore. Mr. Moody has been in the service of the General Electric Company since 1907 when he became sales engineer in the San Francisco office. He was transferred to a similar position in the Seattle, Wash., branch in 1908, and in 1910 was made manager of the Portland, Ore., supply department. Ten years later he was appointed assistant manager of the Northwest territory and retained that position until he went to Los Angeles in 1923. In addition to efficiently handling his varied duties in connection with his work for the General Electric Company, Mr. Moody has taken an active part in the affairs of the electrical industry as a whole on the Pacific Coast. At one time he served as chairman of the Portland



A. S. MOODY

section of the American Institute of Electrical Engineers and was prominently identified with the activities of the Northwest Electric Light & Power Association.

Charles L. Barrett was elected a director of the Pacific Gas and Electric Company at the annual meeting of stockholders held April 8. He commenced service with the San Francisco Gas Light Company, a genealogical predecessor of the Pacific Gas and Electric Company, as assistant to the cashier, his father Wm. G. Barrett, who had been with the company in that position since 1860 or six years after the commencement of gas supply in San Francisco. In his long period of service he has held successively every office posi-



CHARLES L. BARRETT

tion, collector, bookkeeper of consumers' accounts, counterman, manager of the office force, cashier, keeper of the general books, auditor, and finally the secretaryship of the San Francisco Gas and Electric Company, the immediate operating company prior to the advent of the Pacific Gas and Electric Company, which position he has held for twenty-two years, and which period, oddly, his two predecessors Wm. G. Barrett and Joseph G. Eastland each held the position, that is to say there have been but three secretaries in the last sixty-six years of the existence of the San Francisco Gas and Electric Co. In 1906 Mr. Barrett was appointed the assistant secretary of the Pacific Gas and Electric Company which position he has continuously held since that time. His entire career has been notable for his extreme democracy and his interest in employee welfare and for his close attention to the interests of the consumer.

Norwood P. Brockett, public relations director of the Puget Sound Power & Light Company, discussed the proposed Bone power bill before the Washington State Retailers' Association in Seattle at that body's annual convention. Homer T. Bone, author of the bill, discussed the public ownership side of the question.

Charles H. Lee, formerly president of the California State Water Commission and, later, of the Division of Water Rights, has been elected president of the San Francisco, Calif., chapter of the American Association of Engineers.

K. E. Van Kuran, district manager of the Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., attended the recent meeting of the advisory committee of the California Electrical Cooperative Campaign held in San Francisco on May 16 and 17.

L. M. Klauber, president of the San Diego Consolidated Gas & Electric Company, is president of the Pacific Coast Electrical Association for the year



L. M. KLAUBER

E. R. Greer, vice-president and general manager of the Arrow Electric Company, Hartford, Conn., and his son E. Bosworth Greer, arrived in San Francisco, Calif., May 17 on the round-the-world steamer Samaria of the Cunard line. Mr. Greer stayed on the Pacific Coast about two weeks and visited Los Angeles in company with S. H. Gregory, Pacific Coast manager of the company.

A. F. Blecksmith, district sales agent of the Duncan Electric Manufacturing Company, La Fayette, Ind., who maintains headquarters in Los Angeles, Calif., was a recent visitor to San Francisco on business for his company. While in the northern city he attended the school for meter men held at the University of California and participated as a member of the lecturing board.

H. E. Baker, for a number of years associated with the power department of the Pacific Power & Light Company at Naches, Wash., has been promoted to be superintendent of power of the Dallas-Hood River power system of that company with headquarters at Hood River, Ore. Mr. Baker at the same time assumes the duties of manager of the Hood River district, succeeding Berkeley H. Snow, resigned.

H. H. Courtright, manager of the Valley Electrical Supply Company, Fresno, Calif., attended the recent meeting of the advisory committee of the California Electrical Cooperative Campaign in San Francisco.

C. T. Uhl, formerly division sales manager for the Apex Electrical Distributing Company in the Southwest, is now district sales manager for the Pittsburgh, Pa., territory of The United Electric Company, Canton, Ohio.

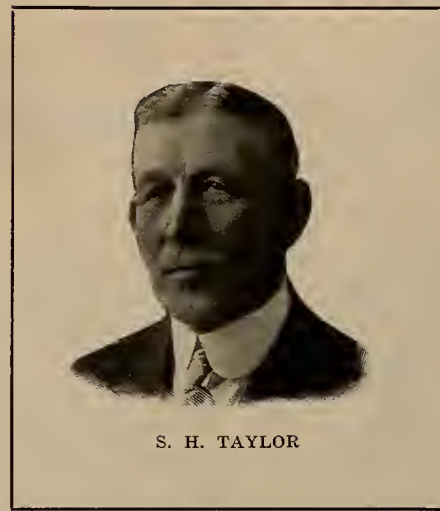
Charles N. Shannon, W. A. Guscott, P. Harry Byrne, E. C. Headrick, and E. A. Scott comprise the new board of directors of the Denver, Colo., Contractors' Association, Inc. Officers will be elected from this group at an early date.

K. E. Van Kuran, manager of the Westinghouse Electric & Manufacturing Company, Los Angeles, Calif., is general convention chairman for the 1924 annual convention of the Pacific Coast Electrical Association, to be held at



K. E. VAN KURAN

S. H. Taylor, secretary of the Pacific Coast Electrical Association, with offices at San Francisco, Calif., is one of the pioneers of the electrical business. His



S. H. TAYLOR

1923-1924. Under Mr. Klauber's direction the association has made notable progress during the past year.

W. L. Frost, manager, consumers' department, Southern California Edison Company, Los Angeles, Calif., attended the recent meeting of the advisory committee of the California Electrical Cooperative Campaign held in San Francisco.

Lewis A. Lewis, sales manager, and W. H. Ude, director of public relations, of The Washington Water Power Company, Spokane, Wash., attended the National Electric Light Association convention at Atlantic City, May 19 to 24. Mr. Lewis is chairman of the Northwest Electric Light and Power Association's electric range committee and will render a report on "Electric Range Survey" at the convention.

A. H. Biewener of the Southern Electric Company of San Diego, Calif., was a recent Los Angeles visitor.

H. C. Chappell, assistant to the general manager of the Natrona Power Company, Casper, Wyo., and secretary of the Wyoming Utilities Association, made a trip to Denver, Colo., early in April in the interest of the annual convention of the utility operators in his state. The convention will be held in the early summer.

A. E. Butler, manager of the Electrical Specialty Company, San Francisco, Calif., is making an extended trip to Eastern cities visiting various factories represented by his company in the Pacific Coast territory.

M. J. Wilkinson, for many years associated with the accounting department of the Pacific Power & Light Company, Portland, Ore., has recently been appointed assistant secretary and treasurer of that company and of the Portland Gas & Coke Company.

R. G. Gentry and John J. Cooper, members of the advisory board, and S. W. Bishop, executive member of the Electrical Cooperative League of Denver, Colo., represented that organization at the National Electric Light Association in Atlantic City, N. J.

T. A. E. Bell, Northwest engineer of the General Electric Company, Seattle, Wash., was the speaker of the day at the meeting of the Engineers' Club, Seattle, on May 15.

connection with the industry covers a period of more than forty years of continuous service, a large part of which has been on the Pacific Coast. Mr. Taylor has contributed largely to the success of the association and of the annual convention held at Coronado, June 16-20, 1924.

H. W. Cooper, formerly manager of the Dayton-Waitsburg district of the Pacific Power & Light Company, Portland, Ore., has been promoted to be district manager at Pasco, Wash.

W. B. Wallis, president, The Pittsburgh Electric Furnace Corporation of Pittsburgh, Pa., has been visiting the principal cities of the West in connection with sales matters. On May 16 and 17 he visited Spokane, Wash., and then went to Butte, Mont. Mr. Wallis is greatly impressed with the industrial development of the western country and anticipates a great growth in the iron and steel business on the Pacific Coast during the next ten years.

Howard S. Warren, switchboard engineer of the Westinghouse Electric & Manufacturing Company of Los Angeles, Calif., recently made two trips to the Arizona and Texas districts of that company, where he was called for consultation on switchboard apparatus for mining companies in the mining region.

C. C. Langevin, of the Atlantic-Pacific Agencies Corporation, San Francisco, Calif., has just returned from an extensive trip East during which he visited among other places, Pittsburgh, Pa.; New York City; Boston, Mass.; Chicago, Ill.; St. Louis, Mo.; and Dallas, Texas.

Otto Bock, former assistant U. S. district attorney in Denver, Colo., and a prominent figure in the younger democratic circles of Colorado, has been appointed a member of the state public utilities commission to succeed the late Tully Scott.

Dr. W. M. Carr, radiologist at the Winnipeg, Man., general hospital, has been appointed radiologist at the Jubilee Hospital, Victoria, B. C., to fill the place of Dr. Warren, who has accepted a position in Los Angeles. The appointment becomes effective on June 1. Dr. Warren came to Victoria about a year ago.

Coronado, Calif., June 16-20. Under his charge have come all of the many details of the arrangements for the entire convention program.

Trade Outlook

San Francisco

Business conditions in San Francisco and adjacent territory, as a whole, are quiet but there is apparently no note of pessimism. Wholesale and retail trade are reported somewhat slow, manufacturing and industry fair. Dealers in specialties are enjoying good business, and sales in hardware, paints and building materials are holding up well. Some readjustment of commodity prices is noted, but no radical decline is anticipated. Buying of general merchandise continues on a conservative basis. Labor costs are steady.

Shippers of fruits, vegetables, butter and eggs are rejoicing over the 10 per cent reduction in express rates on those commodities in carload lots, ordered by the Interstate Commerce Commission and effective on or before June 21. It is estimated that this reduction will result in an annual saving of one million dollars.

The hoof and mouth disease is now believed to be under control and embargoes are being lifted, allowing fruits and vegetables to move more freely.

Building continues at an active rate, particularly home construction. The influence of the latter is reflected in the sales of home furnishings, which are reported good. An increase in the number of ships arriving and departing, with increased tonnage, is reported as compared with the first four months of last year, and a gain of about \$123,100,000 in bank clearings. Collections are slow.

Los Angeles

At the recent elections over forty-five million dollars was voted for city and county bonds, covering projects which will tend to provide employment and put money in circulation in this section. The carrying of these bond issues is an indication of the healthy condition that exists in this vicinity despite the recent real estate inactivity and the foot and mouth epidemic. The latter as yet has not been done away with entirely and has adversely affected business during the past two months.

Local retail business is gradually getting into better shape, and this is particularly true in electrical lines. Radio sales are improving, though somewhat more slowly than other electrical appliances, and wholesale business is in a much better condition than over a month ago. Manufacturers continue to report excellent trade prevailing in their branch of the industry.

Wholesale merchants report trade good, and an increase of about five per cent over business in April is claimed in the grocery lines. Collections are fair.

Portland

Conditions in Portland and vicinity show no marked change during the past two weeks, although there has been some falling off in retail buying probably due to usual summer idleness. It is difficult to determine to what extent

business is being affected by conditions in California due to the hoof and mouth disease. However, prices of citrus fruits, meats and green vegetables have gone up, and the influence of the epidemic is undoubtedly being felt by the railroads and dependent industries, as freight and tourist traffic is below that anticipated.

The entire State of Oregon is badly in need of rain, and unless it comes by June 1 serious damage will result, particularly to the grain crop. The power companies are preparing to carry heavy loads on steam during the late summer, as the present demand is heavier than ever before and the stream flow seriously short.

Building activity continues at a good pace, providing employment for a large number. A greater part of this work is confined to the construction of dwellings, with a fair percentage of larger buildings.

Wiring supplies are reported to be moving fairly well, and stocks are adequate to take care of the demand. Collections are somewhat slow.

Spokane

Business in most lines in this territory gives indications of a decrease, attributed to general conditions throughout the country. The output of the foundries and machine shops is normal, due to the excellent status of the metal mining industry, which is better than it has been for years.

The farmers are somewhat worried over the lack of rain. If it comes within two weeks, then splendid crops of wheat and fruit near Spokane are expected; otherwise severe losses will result, it is feared.

Permits for building in Spokane are above normal. There is a plentiful labor supply, due to an influx from the Coast. Movement in wholesale dry goods is slow. The public is reported to be buying automobiles and labor-saving appliances.

The Washington Water Power Company has completed its seven-week electric range campaign. During that period it sold in Spokane and other towns of the Inland Empire 406 ranges with a total valuation of \$93,000.

Denver

No one factor has had the same effect in stabilizing present business conditions in this state as has the new oil development. Little or no wildcatting and blue sky promotion has evidenced itself. Eleven prominent companies have opened up large offices, and two of these firms are already producing oil from the structures pioneered by them. Realty values, building operations, and employment conditions are all ascending in the oil region principally adjacent to Fort Collins and Craig in the northwestern part of the state.

Other industrial activity continues to evidence itself, and in commercial lines the present program of expansion is without precedent. Two of the largest

department stores of the city are enlarging their quarters as is also one of the banks, with another bank planning a twelve-story building. The telephone company is building a near-skyscraper.

In electrical lines, there is a normal condition with a slowing tendency in the sale of appliances, especially the smaller heating devices. Fans are taking up some of the gap. Building operations are keeping local contractors busy.

Salt Lake City

Resumption of seasonal out-of-door activities is providing additional employment, which naturally reacts favorably on business. The new \$1,500,000 railroad shops of the Denver & Rio Grande Western in Salt Lake City are practically completed and will be opened shortly after June 1.

At the annual meeting of the Inter-mountain Association of Credit Men, held in Salt Lake City recently, there was a significant tone of optimism. Reports of various committees indicated an improvement in business during the past two years that was characterized as remarkable, with a forecast for continued improvement upon the harvesting of fall crops.

Agricultural activities are well under way, and sugar beet acreage is materially increased over 1923. Metal mining continues active. The favorable outlook for metals, as well as the excellent physical condition of the mines, are factors which should operate to keep the mining industry in a thriving condition.

The Utah Power & Light Company is devoting intensive efforts to the sale of electric ranges, with excellent results. This program will continue throughout the summer and fall. While the season for hot-weather appliances is not yet well under way, electrical dealers are looking forward to some good business in this line.

Seattle

According to a detailed report compiled by the Seattle Chamber of Commerce, the first four months in 1924, as compared with a similar period of 1923, showed increases in building construction of 51 per cent; bank clearings, 12 per cent; postal receipts, 10 per cent; cargo tonnage passing over Seattle docks, 27 per cent; lumber production, 4 per cent. Retail and wholesale trade were fair and manufacturing active.

Lumber production is far below normal at present. Reports from logging interests of the Puget Sound district show a close-down of approximately 75 per cent from capacity operation.

Building continues very active, with home construction exceptionally favorable. Similar reports come from other Puget Sound cities, where construction has been heavy all of the present year to date.

Due to continued activity in residence construction, local electrical contractor-dealers report electrical work being maintained with a tendency upward and with prospect of continuance until well into the fall. Sales of housewiring devices, household appliances and electrical apparatus are good. Range sales in considerable volume are reported by both the city of Seattle and the Puget Sound Power & Light Company.

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Announcing Our Northwest Office

IN line with the spirit of progress constituting a definite policy of the McGraw-Hill publications, the *Journal of Electricity* takes pleasure in announcing the opening of a branch office at Portland, Oregon, with Berkeley Snow in charge as Northwest editor.

Mr. Snow, whose career has been summarized in the personal columns in this issue, will devote his entire attention to the electrical industry in the Northwest, so that the industry may find in the *Journal of Electricity* to a greater degree than ever before a medium of expression that will faithfully interpret the progress and best thinking within that geographical section of the great West.

It is the aim and hope of the publishers that, through this extension of their editorial contact, a greater co-ordination of effort may be brought about between the many varied electrical interests in the Western states. With some seventeen hundred miles as the distance between the Mexican and Canadian lines, and a sparse population as compared to Eastern centers, it is vital that everybody within the electrical industry shall be informed at all times of the progress of his co-workers, so that he may benefit thereby.

In undertaking this added service the *Journal of Electricity* feels sure the industry in the south as well as those who are blazing the trail of progress in the Pacific Northwest will benefit thereby. The *Journal of Electricity* looks forward with confidence to a greater usefulness than ever before, and speaks for Mr. Snow the cooperation of its many friends in the Northwest.

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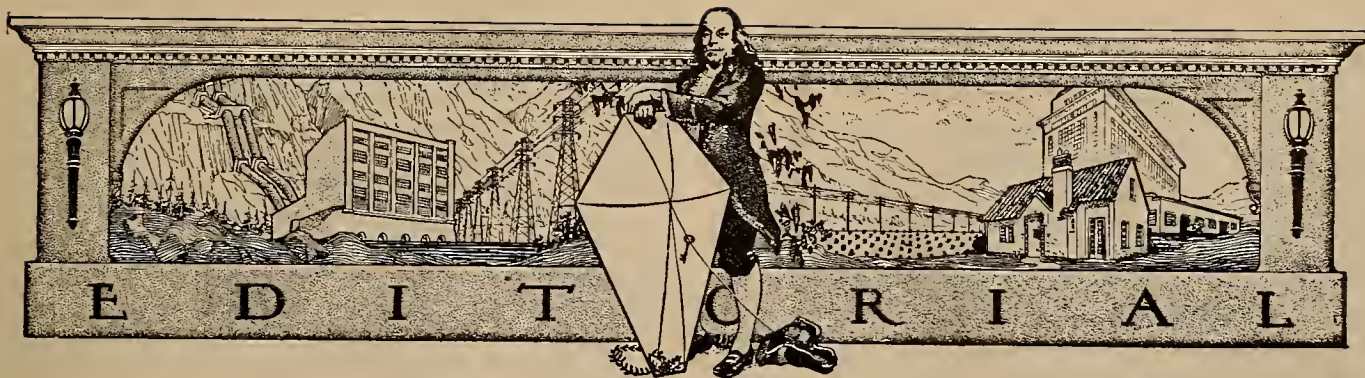
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A Nation of Investors

SEVEN hundred million dollars a year is the amount spent by the American public for fraudulent securities, according to an estimate made by the Better Business Bureau of the Associated Advertising Clubs of the World. Bucket shops, the mails, slick salesmen and wily solicitors each year unload enough Gougem Coal Company 6's, Curious Copper Preferred, Greezo Oil Common and Alaska Codfish Bank 15's upon the unsuspecting public to pay the interest for ten months on all of the billions of Liberty Bonds outstanding. Despite the utmost vigilance of Uncle Sam's agents this gouging continues and, in fact, grows.

COMPARE this with the sum subscribed by the American public to the gas and electric utility companies of the country in 1923. Three hundred millions of the savings of hundreds of thousands of thrifty families was invested in securities of the highest class, securities which are accepted as legal investments for savings banks and which are among the largest holdings of the insurance companies of the country. Ten years of development of the customer-ownership idea is responsible for this achievement.

WE feel positive that were it not for customer-ownership a part, if not all, of the money invested by the public

in the securities of the public utility companies which furnish them service would have gone the way of the seven hundred millions which disappeared like water in a squirrel hole.

FROM the standpoint of the central stations customer-ownership is self-ish. They are able, through the disposal of their common and preferred stock to the public, to raise a portion of their construction funds. In addition to sounder financing, they gain the friendly interest of a large and influential group of citizens in the communities which they serve. In other words, their public relations is greatly improved. This self-interest in the customer-ownership idea has had a tendency to overshadow some of the broader aspects of the problem. The public utilities must not overlook the public.

NO matter what the gain to the companies, in the final analysis the public itself is the greatest gainer. It is inherent for the American to own something, i.e., to invest. In providing the means for an easy and safe investment, the power companies have performed a great and lasting service. They are transforming the country into a nation of investors and in so doing they are helping to make a more contented and more prosperous people.

Superpower Again Takes the Stage

SUPERPOWER again makes its appearance in print, this time from a slightly different angle and with a new suggestion for its development. A bulletin entitled, "Hydroelectric Power in Washington, Part 1, A Reconnaissance Survey," by Carl Edward Magnusson, professor of electrical engineering of the University of Washington, has recently been published by the university, and is reviewed in another section of this issue.

The bulletin contains considerable material of interest to the student of power development possibilities in that state, as well as much food for thought for those interested in seeing a superpower program of development economically and efficiently consummated. It is generally conceded that here in the West is found a semblance of a superpower system. It is perhaps also generally conceded that the system is yet incomplete and far from perfect. Professor Magnusson subscribes to these views in general, but indulges in stronger language as follows: "The present interconnecting practice is merely a step in the right direction, a temporary makeshift by which comparatively small advantages may be gained." We cannot agree that the advantages that will accrue to the people of the three Pacific Coast states during the impending season of drouth, by reason of our interconnected power systems, will be "comparatively small." We must contend that the advantages have been great and will continue to be greater as the normal development of our superpower systems of the West progresses.

But we do not intend in this comment to treat Professor Magnusson's bulletin critically. We recognize in it a valuable contribution to the complete knowledge and understanding of the superpower possibilities of the country, and we recommend its perusal to all that would view the problem in a large way. He unquestionably has sounded the keynote of the principal difficulty that will have to be surmounted before a perfected operating system is possible when he says, "Fundamental questions of ownership and control, regulation and management, and in fact most of the complex administrative and legal problems of public utilities, require new interpretations and call for solutions consistent with the imposed conditions." Further, there is a prophetic ring to the following significant utterance: "In the creation of superpower systems for any extensive region, as the State of Washington, the Pacific Coast or the Atlantic Seaboard, it may be found desirable to consider a new cleavage and to provide a separate organization for each field of industrial activity; manufacturing, transportation and retailing of electric energy." These statements will undoubtedly furnish the basis for some thought by public utility officials.

His suggestion, however, for federal ownership of the transportation phase of the business we believe no more necessary nor advisable than federal ownership of railroads. "Common carrier principles," as applied to the regulation of railroads, can be applied to trunk transmission lines as readily without

government ownership as with it; and it will perhaps not be necessary to delve again into the government ownership controversy to support such a statement.

His recommendation, "That a State Power Commission be created, . . . empowered to conduct comprehensive engineering power surveys of all the streams in the state, etc.," might well be expanded to include the surrounding states as well. Without attempting to minimize the importance, in a superpower system, of the State of Washington within the boundaries of which is enclosed sixteen per cent of all the available water powers of the United States, it must be recognized that superpower development should be guided by economic influences rather than political and geographic ones, and cannot be perfected without utilizing the power of the other four Western states that, with Washington, contain over sixty per cent of the country's potential hydroelectric power.

Electricity in the Architect's Home

"ELECTRICAL homes for electrical men" reads the slogan, the theory being, of course, that the man who uses electrical equipment himself will be able to urge its use by others more sincerely and more convincingly. A similar slogan might be a very useful one in connection with the electrical education of the architect. Much has been said in the past of the necessity of convincing the architect of the advisability of installing electrical conveniences in the modern home—articles have been written for architectural magazines, addresses have been made before architectural gatherings and calls have been made upon the individual men in their offices. But the architect is rightly a conservative. He hesitates to recommend to his client anything which he regards as still in the experimental stage, however great its advantages—and in consequence often omits electric refrigeration, cooking equipment and air heating in homes which could well afford the comfort and cleanliness of these conveniences. Why not try reaching the architect in his own home? If his own house is provided with an electric ice machine and he has the testimony of his wife in regard to its success and economy, he will have the confidence of knowledge in recommending it to others. The electrical industry might well consider ways and means of facilitating the purchase and installation of electrical equipment by the architectural profession. Why not the slogan, "Modern homes (which means, of course, electrical homes) for architects"?

Lighting and Heating Schools for the West

NATIONAL schools for teaching industrial heating practice and sales methods, as also schools in illumination and other commercial fields of power company enterprise, have been conducted annually for some time under the auspices of the National Electric Light Association. A few representatives from the Pacific Coast have taken the opportunity thus offered and have attended these schools. But the expense

involved is proportionately high as compared with other sections of the country—and not many companies have felt that they could afford to send their employees so far. There are, moreover, specific Western problems consequent upon the difference in climate and in the nature of the industrial development in this district which cannot be fully met by a national group. In consequence, the tendency has grown up to establish Western schools to cover these respective fields. This has already been done locally in the case of lighting schools—and a recommendation has been made by a committee of the Pacific Coast Electrical Association to open a school in air heating for California. Hardly less urgent than these two fields is that of industrial heating which will undoubtedly make its own demand soon for local instruction. The day has passed when one school or university can meet the national needs for academic training—and it is high time that the West developed a system of schooling to meet its own needs in commercial and vocational fields.

Are We Suffering from the Hoof and Mouth Disease?

WHEREVER men gather there is heard the question, "How is business?" Normally the answer is "Good," but of late we have heard many pessimistic replies. Certain information that has been imparted to us and an investigation of actual conditions reveal that there is no ground for concern in the present situation. Quite to the contrary, the general report is of a larger volume of buying than during the same period of last year. The class of merchandise bought may differ but the gross sales are greater and the material sold all shows a profit. In addition, the character of this year's business seems to be firmer and less speculative than for some time past and the development, therefore, seems healthier. Expressions of foreboding are apparently untimely and can have but one reaction—a disadvantageous one. Business is sensitive to treatment and often trembles at rumor. A practical application of the old Roman maxim "Nihil nisi bonum" would react in greater general confidence and less conservative buying. Continued unfavorable comments will show that even humans may suffer from the hoof and mouth disease, and that they can turn their feet away from business and talk themselves into an unpleasant situation.

Westinghouse Celebrates Forty Years of Service to Industry

FORTY years is not a long time, yet, in the period between 1884 and 1924, the strides taken by industry have been greater than for any similar period recorded by mankind. Then the telephone was only eight years old; the arc lamp was sputtering fitfully on a few streets of our larger cities; Thomas A. Edison was just about ready to introduce his incandescent lamp into the homes, and the central station was coming into being.

George Westinghouse, then thirty-eight years old and with his famous air brake fifteen years in the service of the railroads, turned his energies toward the development of the electrical industry.

To the Westinghouse Machine Company, then four years old, he added the Interlocking Switch & Signal Company, and merged it into the Union Switch & Signal Company. His next step was the organization of the Westinghouse Electric & Manufacturing Company, in conjunction with William Stanley, to engage in the manufacture of a self-regulating dynamo for lighting service.

It is a far cry from the small beginning of forty years ago, to the great manufacturing establishments that bear the Westinghouse name today. Their accomplishments would fill volumes. There are the alternating-current system for the generation, transmission, transformation and application of electricity; the alternating-current meter, non-arcing lightning arrester, step-type regulator, induction motor, the lighting of the World's Exposition at Chicago in 1893, the harnessing of Niagara Falls for the generation of electricity, the introduction into America of the steam turbine, and countless other contributions to the wealth and comfort of the people.

Our congratulations are heartily extended to the Westinghouse company, in the feeling that its record of achievement in the past is the best prediction for an even greater future.

Crackers and Conventions

THE convention idea is growing. This is particularly true of the electrical industry, which has been satirically described as a body of men entirely surrounded by conventions. Every once in a while executives wonder, especially at the time when expense accounts pile up on the auditor's desk, whether it is really worth while, whether the amount of constructive good resulting from the annual, semi-annual or quarterly meetings is sufficient to justify the cost in time and money.

Perhaps the first conventions took place at the crossroads store in the days when the United States was industrially very young indeed. They were informal and voluntary. With the assistance of a plug of tobacco and an open box of crackers involuntarily contributed by the storekeeper, the affairs of the national as well as local gossip were discussed ad infinitum. It is a far cry from then to now, but the principle of the thing is precisely the same. There is no more humanizing influence than contact with one's fellow man, and the interchange of ideas on subjects of mutual interest.

Nevertheless, it is well to sound a note of caution, lest the box of crackers be permitted to constitute the chief interest. Play is an excellent thing, in its place, and a trip to some attractive resort is undoubtedly delightful, especially when it is made possible by the liberality of employers. Those who are privileged to attend conventions should not forget that, in doing so, they have accepted an obligation which they are in honor bound to discharge by conscientious attention to the serious side, that they may be better equipped to fill their positions to their own and their employers' advantage. All play and no work makes Jack a poor boy.

CURRENT COMMENT



Early developments indicate that the proposed \$500,000,000 California Water and Power Act will play a much more prominent part in the press of the state in 1924 than it did in 1922.

Water and Power Act Draws Fire From Rural Press Moreover, the discussions this year will be more sound for they will be based upon the experience gained during the campaign two years ago. As an indication of what may be expected, especially from the papers of the rural districts, the following quotation from an issue of the Saratoga (Calif.) Star is offered:

Once again the Galahads of Public Ownership are to assail the naughty public service corporations with a new Water and Power Act. This time they expect to win, not alone because their heart is pure but because they intend to do some advertising on a large scale to offset advertising by the power companies and their friends. The publisher of the Star had a very pleasant talk with a representative of the forces behind the new Water and Power Act. We liked him. He was courteous, idealistic in a practical sort of way, and, we were most grateful to note, he did not accuse the press of California of being bribed in the last campaign. Public ownership advocates frequently have a tendency to accuse those who disagree with them of being knaves or fools.

We told him frankly that we could not agree with him, and that we believed a paper has the right to have a clearly defined editorial policy. We stated, however, that the Star, while cheerfully accepting all advertising, has an independent news and editorial policy, and that during the campaign, as a proof of this fact, the Star will run a column each week of bulletins or other campaign matter prepared by the Water and Power Act headquarters, irrespective of whether this paper received any of their advertising or not. No one can ask more than that. The only stipulation is that this matter is to show its source.

The objections to public ownership are so many and so important that it is difficult to deal concisely with the subject. Under present conditions, public ownership means control by a minority of the public. You cannot get every citizen to register. As a rule, not more than fifty per cent of those who take the trouble to register vote at an election. Thus a very small minority of voters frequently decides important matters, and the public ownership advocates, we believe, would have a stronger case if they would devise and demonstrate some way of making the "voters" vote.

Furthermore, the usual motive of voting, it is hardly cynical to say, is some variation of the classic phrase "Let's kick the rascals out."

A public service corporation has to pay dividends, and for that reason its executives are chosen primarily for their efficiency. How the public could select executives for technical ability instead of judging them only by their agreeableness as politicians is a conundrum we cannot answer. Furthermore, the lesser employees of a public service corporation usually do their work or are discharged. In this problem, the state has to choose between the old spoils system or the civil service "merit" system, and the latter is preferable to the spoils system. It however usually means that an employee cannot be discharged for inefficiency or laziness, because such a discharge is attended with so much red tape about hearings, etc., that the department head merely tolerates an inefficient employee and hopes for better luck when he draws another assistant.

A week or so ago, we read the letter of resignation of Will J. French from the Industrial Accident Commission. It was too long to print, but it indicated that Mr. French, the

last of the original board of commissioners, resigned because recent appointments and policies were dictated by politics rather than considerations of efficiency. Now the Industrial Accident Commission was so well conceived and so ably administered that it was a model not only for other states but for other nations. If it could not be kept free from politics, no body ever can. This commission does work that must be performed by the state. The Star believes that the Industrial Accident Commission, the Railroad Commission, the Highway Commission, and the other bodies doing work which cannot be performed by private agencies are about as big a mouthful as the state can masticate in this generation. We believe that sooner or later placing power and water interests under the state would be to the detriment of the public, until a more efficient state government is achieved.

The Star sees no moral question involved in this issue. We do not believe that any body of men or corporations has a "vested interest" in public utilities. We do believe, however, that power interests in this state are better administered than they would be under public ownership. We think there is fairly conclusive evidence of this in the fact that the use of electricity is more general in this state than in other commonwealths. We believe in public supervision of corporations, but we do not believe in throttling them, and we think that in the present state of evolution of the American national commonwealth the public service corporation is the best method of handling its functions, if the corporation is run with average ability and honesty. If the corporation is bad, public ownership is preferable.

Of course, efficient public management is not impossible, but it is so improbable that continuous efficient management by the state is to all intents and purposes only a theory. Los Angeles and her Owens River project are frequently cited as proof of the practicability of public ownership. This project ever since its inception has been under the one-man control, we believe, of an exceedingly able engineer. His retention for that length of time in that position is a miracle of American politics in a political unit not otherwise noted for statesmanlike sagacity or purity of administration. To hope for a similar miracle by the state is taking too much of a gambler's chance.

DISCUSSION



Motives of Journal of Electricity in Opposing Municipal Ownership Questioned

No feature published in the Journal of Electricity has elicited wider comment than the interview on municipal ownership with Ole Hanson, former mayor of Seattle. The article was reprinted in full in many of the newspapers and periodicals of the Pacific Coast states and was also the subject of considerable editorial comment. The interpretation placed upon the interview depended to a large extent upon the leanings of the particular journal in which it was used. There is one case which we feel should be called to the attention of our readers. The following quotation is taken from the Seattle (Wash.) Union Record of April 23, 1924:

"Ole Hanson, who, as mayor of Seattle, tricked the people into buying a \$7,500,000 street car line for \$15,000,000, has decided that he is no longer in favor of municipal ownership. This is disclosed by an interview with Hanson, entitled 'Why I Do Not Believe in Municipal Ownership,' appearing in the current issue of the Journal of Electricity, a semi-monthly magazine published by the private power interests of Los Angeles."

In an effort to clarify the obvious misstatement in the above paragraph the following letter was sent to the publisher of the Seattle paper:

May 16, 1924.

Publisher,
Seattle Union Record,
Seattle, Wash.

Dear Sir:

Our attention has been called to a story appearing in the columns of your paper under date of April 23, 1924.

In the first paragraph the statement is made that the Journal of Electricity "is a semi-monthly magazine published by the private power interests in Los Angeles." If the material appearing on other pages of your paper is as glaringly inaccurate as the above statement we wonder how you are able to hold your subscribers.

In the first place, the Journal of Electricity is an independent publication published by the McGraw-Hill Company of California, a subsidiary of the McGraw-Hill Company, Inc., of New York, one of the largest publishers of technical books and magazines in the world. We have no affiliations with either the electrical industry or any other industry to which our magazines cater. We are opposed to government or municipal ownership of private business because we feel that it is at variance with the ideas and ideals of the American people.

We should be glad if you will be kind enough to retract the statement made in the news item referred to above.

Yours very truly,

GEORGE C. TENNEY,
Managing Editor.

In answer to the above the following letter was received from the Union Record:

May 19th, 1924.

Mr. G. C. Tenney,
Journal of Electricity,
883 Mission St.,
San Francisco, California.

Dear Sir:

Your letter pointing out our error with respect to the Journal of Electricity will be published on the editorial page of the Union Record. We regret very much that this error was permitted to creep into the paper. The article in which it occurs was not written by a member of the staff but was contributed by a well known local engineer.

If similar errors have never found their way into your publication then you are indeed the most fortunate editor in the country. Your insinuation that other articles are in error because you found a single mistake in one article is indicative of a lack of restraint unworthy of reply. You say that you are opposed to government or municipal ownership because you feel that it is at variance with the ideas and ideals of the American people. We feel that you have misinterpreted the ideas and ideals of the American people, even if we are willing to take at face value your statement that you are not influenced by any large advertising receipts you obtain from the interests you defend.

Accept again our sincere regrets for the unfortunate mistake in the Union Record which we shall hasten to correct.

Yours very truly,

SEATTLE UNION RECORD,

SAUL HAAS,
Managing Editor.

The above letter challenges the statement that the Journal of Electricity is an independent publication with the inference that its policies are influenced by the advertising revenue it receives from the interests it defends. An analysis of the advertising receipts for the year 1923 shows that the total revenue from advertising placed by the privately owned

electric utilities operating in the eleven Western states was but \$1,757 or but \$35 per company if all fifty had used space. This \$1,757 is 1.45 per cent of the total revenue derived from advertising during that year.

In 1922, the year of the campaign for the California Water and Power Act, a measure which was opposed by the Journal of Electricity, the advertising revenue received from the power companies was \$3,280 or 2.7 per cent of the total advertising receipts for the year.

These figures show the absurdity of the inference made by our contemporary in the North. It is not wise to impute motives without some basis of fact.

THE EDITORS.

Engineer Explains Reason for Choosing Route of Los Angeles Aqueduct

To the Editor:

Sir: In your issue of the 15th inst., you state editorially that the Los Angeles aqueduct was built on a flatter grade than necessary at an extra expense of several million dollars, in the upper portion of the canal, in order to increase and concentrate the fall for hydroelectric development near the city. This was done, you say, to assist the subsidiary Bureau of Power and Light at the expense of the main project.

The facts in the case are these. The aqueduct had two possible points to pierce the Sierra Madre range, one near Acton into the head of the Soledad canyon, and the other under Elizabeth Lake into the head of the San Francisquito canyon. The first line would have crossed the Antelope Valley near the line of the Southern Pacific Railroad. This would have been a shorter route than the other, but would have required a long syphon with considerable head. The westerly route—the one selected—skirted the north side of Antelope Valley until it reached a point where a short syphon with a low head put it across the valley, whence the canal led to the portal of the Elizabeth Lake tunnel. This tunnel is five miles long, and is the longest single tunnel on the aqueduct system.

If the aqueduct had been built on the steeper grade that you suggest, the cross-section would have been smaller, and the canal distance less, with a consequent saving in cost on this part of the project. But the tunnel under the Sierra Madres, would have been longer than the one that was built, and could have been made fifteen miles long by your method of construction. It was purely a question of balancing tunnel costs against open canal—a longer canal meant a shorter tunnel.

The present alignment of the aqueduct was the most economical location for the building of the water way, regardless of the fact that it did improve the power possibilities incidental to the project.

I am sure that your readers, who are most of them engineers, would have more respect for your editorial opinions, if you were careful to ascertain the facts before expressing an opinion.

GEO. R. SHUEY,

Assistant Engineer, Department of Public Service, City of Los Angeles.

Independence, Calif.
May 20, 1924.



NOTABLE progress has been made in the customer-ownership drive in the ten years that Western utilities have been fostering this movement. The utilities have secured success by courteous treatment of all customer-owners and by careful attention to details. Illustrations show the care taken by the Southern California Edison Company in filling out stock certificates and by the Pacific Gas and Electric Company in mailing dividends.



Development of Public Investment in Privately Owned Utilities

By George C. Tenney

Managing Editor, Journal of Electricity

CUSTOMER ownership needs little or no introduction. Originated ten years ago by the Pacific Gas and Electric Company, it has been adopted by most of the leading utilities of the country. It is estimated that today the light and power industry of the United States is owned by no less than two million investors and that 600,000 of these own securities in the companies which furnish them service. Conservative estimates place the amount

of new capital raised through customer ownership activities during 1923 by the light and power companies for construction and extension purposes at \$300,000,000. In many cases utilities have been able to raise 75 per cent of the money required for such purposes through the sale of junior securities to the public and have had to depend upon the sale of bonds for but 25 per cent of the capital necessary to keep pace with the growth of the territory served. Judged in the light of past growth the time is not far distant when the ownership of the light and power industry will pass into the hands of the public through the universal ownership of securities in the enterprises which make up this industry. The prediction has been made that within the next ten years the number of customer owners will have passed the five million mark.

Much has been said and written regarding the benefits that accrue both to the public and to the utilities through the widespread distribution of securities among customers. It is obvious, however, that a plan of this kind which enables public service companies to raise a considerable portion of the capital necessary for construction through the sale of stock, and at the same time to secure the favorable interest of a large and representative class of people should commend itself to the utility companies. That the program is both sound and successful is demonstrated by the number of companies in the light and power industry which have adopted the plan and in the widespread interest that is being shown in it by industries outside the field of the utilities.

From the standpoint of the public at large customer ownership has many obvious advantages. Babson's Report recently commented on this phase of the subject as follows:

CUSTOMER OWNERSHIP as developed by the gas and electric utilities of the country has made great strides during the past few years. Originated in the West, its progress has been more marked among western utilities than those of any other section of the country. In 1923 the electric companies of the Pacific Coast states increased the number of their stockholders 30 per cent. This article reviews the progress which has been made.

"Fitting into this situation, from the standpoint of the investor, is the fact that customer ownership offers a safe investment opportunity for the man of moderate income who can lay aside only a small amount each month. An important reason why fraudulent investment schemes and bucket shops have flourished since the war is that the conservative investment house as a rule is not organized or equipped to serve the person of small

means who has no money to invest except out of current income. The cost of handling such accounts is too high to make it profitable.

"Hence, the sale of preferred stock under customer ownership plans by public utilities is a protection to the inexperienced and small investor who desires to own securities. While fundamental economics would urge the savings banks as the most suitable depository for the money of the man of small means yet the fact remains that the desire to invest is so deep rooted that there will always be a certain percentage of men and women who will insist on investing rather than saving it. It is, therefore, in the interests of such persons that customer ownership functions. It offers securities purchasable in small amounts in an enterprise which the investor knows something about. As an asset to the company, customer ownership increases good will of the company because of the presence among the stockholders of a large number of local investors whose friendly influence will extend through the community served by the company."

It is appropriate enough that in the West where the idea originated, customer ownership has made the greatest strides. Of the 50 major privately owned electric utilities operating in the eleven Western states, 25 have undertaken customer ownership programs. Nor have the activities been confined to the larger companies alone. Some of the smaller utilities have been among the most enterprising in this work.

A survey of customer-ownership activities of these companies during 1923 which has just been completed by the Journal of Electricity shows that on Jan. 1, 1924, the 3,215,516 shares outstanding of the twenty-five companies actively engaged in selling

Customer-Ownership Progress Among Western Utilities in 1923

NAME OF COMPANY	Headquarters	Territory Served	Population Served	No. of Consumers (Electric Only)	Total Shares Outstanding Jan. 1, 1924	Total Shareholders Jan. 1, 1924	Total Shares Outstanding Jan. 1, 1923	Total Shareholders Jan. 1, 1923	Total Consumer Shareholders Jan. 1, 1924	Total No. Employees	Total Employee Shareholders	Total Shares Owned by Employees	Total No. Shareholders Owing 10 Shares or Less
The California-Oregon Power Co.	Medford, Ore.	Calif.-Ore.	50,000	13,576	33,706	1,662	29,388	1,228	1,251	204	138	1,026	1,325
Coast Counties Gas & Electric Co.	Santa Cruz, Calif.	Calif.	20,000	5,565	8,559	1,911	3,866	880	1,806	157	32	815	422
Coast Valleys Gas & Electric Co.	Salinas, Calif.	Calif.	25,000	6,966	34,838	186	34,423	106	66	120	45	495	110
Deschutes Power Co.	Spokane, Wash.	Oregon	2,500	965	3,000	53	2,944	53	12	13	2	8	28
Dixie Power Co.	St. George, Utah	Utah	11,000	1,429	2,263	210	2,252	209	200	20	6	276	190
Enterprise Electric Company	Spokane, Wash.	Oregon	3,500	1,219	2,390	61	2,314	61	12	10	5	31	39
Grangeville Electric Light & Power Co.	Spokane, Wash.	Idaho	600,000	1,302	4,340	159	4,053	151	13	14	4	4	79
Great Western Power Co.	San Francisco	California	1,000,000	45,833	70,240	4,556	60,213	3,575	*	1,047	*	*	*
Idaho Power Company	Boise, Ida.	Idaho	150,000	40,161	32,910	2,303	13,100	659	1,153	577	122	762	*
Los Angeles Gas & Electric Corp.	Los Angeles	California	840,000	85,370	69,917	3,754	57,902	3,027	*	3,950	200	1,100	2,470
Natrona Power Company	Casper, Wyo.	Wyoming	15,000	6,194	703,629†	40	601,577†	37	*	75	3	36,347†	*
Northwestern Electric Co.	Portland, Ore.	Ore.-Wash.	275,000	17,916	131,724	2,301	126,616	1,615	750	250	210	600	1,569
Pacific Gas and Electric Co.	San Francisco	California	1,800,000	335,955	898,756	27,013	858,993	25,890	*	9,993	1,690	19,637	14,643
Pacific Power & Light Co.	Portland, Ore.	Ore.-Wash.	140,000	34,618	46,876	2,779	43,261	1,680	1,449	597	255	879	2,100
Portland Electric Power Co.	Portland, Ore.	Ore.-Wash.	330,000	69,004	260,260	4,425	233,752	2,283	*	3,183	*	3,125	*
Public Service Co. of Colorado	Denver, Colo.	Colorado	420,000	79,537	29,933	6,347	16,384	668	5,510	1,513	551	972	5,804
Puget Sound Power & Light Co.	Seattle, Wash.	Wash.-Ore.	390,000	80,723	431,900	8,165	406,190	*	*	2,400	870	3,096	1,215
San Diego Consolidated Gas & Electric Co.	San Diego, Calif.	California	150,000	39,478	51,254	2,653	41,256	2,150	1,870	1,027	127	1,258	1,656
San Joaquin Light & Power Corp.	Fresno, Calif.	California	350,000	55,465	257,519	10,440	245,194	4,387	3,769	1,429	1,300	2,733	7,298
Southern California Edison Co.	Los Angeles, Calif.	California	1,500,000	229,404	576,247	65,636	516,247	48,107	55,000	5,300	4,126	70,176	*
Southern Colorado Power Company	Pueblo, Colo.	Colorado	200,000	19,369	23,250	1,752	20,828	1,281	1,752	377	45	309	1,311
Utah Power & Light Co.	Salt Lake City, Utah	Idaho-Utah	340,000	77,954	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Washington Water Power Co.	Spokane, Wash.	Washington	150,000	43,830	201,804	2,874	177,791	2,153	*	719	91	1,225	1,282
Western States Gas & Electric Co.	Stockton, Calif.	California	100,000	34,020	34,480	1,084	31,480	951	813	360	130	632	796
Wood River Power Co.	Hailey, Ida.	Idaho	2,500	750	2,316	21	1,689	20	9	11	4	78	10
						1,326,603	3,215,516(b)	150,385	2,936,151(b)	101,171	33,346	9,955	109,600(b)

*No Record.
†-\$1 par value.
(a) No report received.
(b) In these totals stock of Natrona Power Company having \$1 par value was included as units of 100 shares each to conform with stocks of other companies which have \$100 par value.



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Portland, Seattle, San Francisco
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ANNOUNCEMENT

The California Oregon Power Company wishes to announce the offering of a block of its seven per cent preferred capital stock, which is to be sold at ninety-two dollars per share. To realize seven and six tenths per cent on the investment.

This stock will be sold for cash on special savings plan.

Further details may be had at any of our offices or from employees of the company.

THE CALIFORNIA OREGON POWER COMPANY

For more information contact
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THE ASSOCIATED GROWER

Volume 6 JANUARY, 1924 Number 1

PRESIDENT COOLIDGE SAYS:

"He (the farmer) must have organization.

"His customer with whom he exchanges
products of the farm for those of industry,
is organized.

"Labor is organized, business is organized.

"And There is No Way for agriculture to
meet this unless it, too, is organized."

In his message to Congress
delivered Dec. 6, 1923.



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Seattle, Tacoma, Everett

Babson says—

"There is every reason to
believe that the best part of our
country is working hard to get a line
out of the money market. It is not
the money market that is the
problem. It is the money market
that is the problem. It is the money
market that is the problem. It is the
money market that is the problem."

COPCO
preferred

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POWER COMPANY

Portland, Seattle, San Francisco
and
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"Economy is one of
the highest virtues.
It begins with
Saving Money"
—A Lincoln

Terms as low as \$10 a month enable you to save small sums
and at the same time invest wisely in our
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- Trunk line of a 91,000-mile marketing system.
- The largest of its kind in the world.
- Reaching more than one-half the State's population.
- Consisted with 24 water and 4 steam power plants.
- With a capacity of 415,000 horse power.
- Under construction: 4 water power plants,
capacity 117,000 horse power.

Pacific Gas and Electric Company

The Foundations of Credit—Earnings and Assets

AN INDICATION of California's future development, it is a matter of
great significance to investors in securities of its public utilities that
the most fully published financial returns show that the State is now led,
during the past ten years, the largest increase in population of any state in
the Union, considering both numerical increase and rate of growth. This
increase was 140,000, or 44.4%. The percentage of growth was almost three
times that of the United States as a whole.

The splendid progress for the enduring prosperity of California's public
utilities carries with it, however, the responsibility on the part of investing
the funds of the increasing population through the constant enlargement
of facilities.

THE PACIFIC GAS AND ELECTRIC COMPANY has met this situation in the
past ten years through the expenditure of more than \$55,000,000 for com-
munications and additions to its properties. It has been engaged in developing the com-
plete hydro-electric resources of the Pit River basin and in other respects also
showing its faith in the future growth of the State and its inability, due to its
responsibility among financial positions, to rest for future demands as adequately
as it has in the past 16 years of its own and predecessor corporation's history.

The financial strength of a corporation is measured by the degree to which
it can engage the confidence of investors in its securities. The two pillars of
this credit are earnings and assets. We present below statements showing the
earnings and assets of the PACIFIC GAS AND ELECTRIC COMPANY:

INCOME ACCOUNT FISCAL MONTHS TO SEPTEMBER 30, 1924			
	1923	1924	Increase
Gross Earnings (including Miscellaneous Income)	\$22,879,072	\$18,444,831	\$4,434,241
Operating Expenses (including Depreciation, Taxes, Insurance, Fuel, etc.)	3,863,179	2,877,444	985,735
Amount available for interest on all First Mortgage Bonds outstanding at all times during the year	1,915,893	1,567,387	348,506
Interest on First Mortgage Bonds	1,437,498	1,238,000	199,498
Dividend, Retained	2.5 cents	2.5 cents	

ASSETS—CONDENSED BALANCE SHEET, AUGUST 31, 1920	
Plant and Equipment	\$102,326,997
Investments and Securities	6,442,347
CASH AND OTHER CURRENT ASSETS	894,237
Other Current Assets	1,415,752
Total Assets	\$110,979,333
LIABILITIES	
Capital Stock	\$34,904,000
Reserves	2,777,115
First Mortgage Bonds Outstanding	1,567,387
Other Bonds Outstanding	1,567,387
Other Current Liabilities	1,567,387
Total Liabilities	\$34,904,000

Pacific Gas and Electric Company First Preferred Stock is held by more than 9,000 investors. With the exception of Liberty Bonds it is probably the most widely owned high grade investment security in the State of California. Earnings conditions remain favorable for the present, at the attractive price of \$80 per share, payable at purchase (coupon order) as full or in any installment. Dividends \$8.00 per share per annum, payable at the rate of \$1.50 per share every three months by check mailed to stockholders. At the present price, an investment in this stock yields 7 1/2%.

Orders may be placed or further information obtained at any of our offices, or at
441 South Street STOCK SALES DEPARTMENT San Francisco

What Ten Dollars Will Do--

- \$10.00 spent for a dinner lasts ten hours.
- \$10.00 spent for a hat lasts ten weeks.
- \$10.00 spent for a suit lasts ten months.
- \$10.00 spent on our 7% Preferred Stock outlasts a lifetime, because this Company's service will always be necessary to the progress and comfort of the nearly forty communities served by it.
- On our Saving Plan \$10 is accepted as cash payment on one share of stock, balance to be paid in monthly installments of \$1.00. The man or woman subscribing for One Share is as welcome as the subscriber for many shares. Our Saving Plan is the convenient way to secure this high-interest-paying stock and is available to everyone.
- If you now have money or if you wish to save money to earn over 7%—invest a strong interest with us. Subscribe for a number of shares and pay for them month by month. Your payments, as deposited with us, earn 7% interest until final payment is made. Then, as the owner of Portland Railway, Light & Power Company Stock, every one of your invested dollars will earn over 7% in dividends.
- Every three months you will receive a dividend check.
- Ask for details about this profitable home investment. You can send no money in doing so—\$10.00 is all that is needed.

**Portland Railway, Light
& Power Company**
403 Electric Building Portland, Oregon

Shares are \$98.00, to Yield 7.14%
Cash or Savings Plan



to the public were owned by 150,385 stockholders. An idea of the growth of the movement can be gained from the figures for the preceding year. On Jan. 1, 1923, these same companies had outstanding 2,936,151 shares which were owned by 101,171 stockholders. Thus 279,365 shares of stock were sold to 49,214 new stockholders during the year 1923.

From the accompanying table, it will be noted that some of the companies showed remarkable growth for the year. The Coast Counties Gas & Electric Company, the Idaho Power Company, the Pacific Power & Light Company, the Portland Electric Power Company (formerly Portland Railway, Light & Power Company), the Public Service Company of Colorado, the Puget Sound Power & Light Company, the San Joaquin Light & Power Corporation, and the Southern California Edison Company were among the leaders. The position of the last named utility is worthy of particular note. At the time the survey was made its stock was owned by 65,636 stockholders of whom 55,000 were consumers. No company in the United States can approach this record.

The table also shows that considerable progress has been made in the distribution of stock among employees. Out of a total of 33,346 employees in these twenty-five companies 9,955 own 109,600 shares of stock. Sixty-seven and one-half per cent of the employees of The California Oregon Power Company are stockholders in the company; 84 per cent of the employees of the Northwestern Electric Company own stock; 91 per cent of the employees own stock in the San Joaquin Light & Power Corporation and 78 per cent of the employees of the Southern California Edison Company receive dividends from company securities.

The survey showed that two distinct methods are employed in selling stock to the public. In approximately half of the cases all stock is sold by employees in connection with their regular duties. A small commission is paid on stock sold. From the reports received this method has proved very effective. The remainder of the companies maintain a separate stock sales department with manager and salesmen. In some cases the sale is confined entirely to these men while in others employees work in conjunction with the stock sales department. Salesmen work on a straight salary or a salary and commission basis.

An idea of the sales methods can be gained from the following account of the procedure followed by the various individual companies:

The California Oregon Power Company.—Stock is sold by employees and by a direct-by-mail campaign supervised by the secretary of the company. Liberal use is made of newspaper advertising and stock literature is sent out from time to time. A flat commission of \$1 per share is paid to employees.

Coast Counties Gas & Electric Company.—Direct solicitation of consumers by employees is the procedure employed by this company. Considerable space is used in the newspapers of the territory served. A special prize of \$10 is paid each month to the member of each district securing the largest number of new stockholders (minimum, five new subscribers). No commission is paid to officers of the company or to district managers. Employees are paid \$1 per share for the first five shares to any one subscriber and 25 cents per

share for all over five. In addition \$2 is paid for each new subscriber obtained regardless of the number of shares sold.

Coast Valleys Gas & Electric Company.—This company does not conduct any intensive campaigns. Most of its stock has been sold by a salesman employed for that purpose. All of the local papers are used for stock sales advertising. Stock bulletins are also mailed out to stockholders and consumers from time to time. A flat commission of \$1 per share is paid to employees selling stock and to the salesman.

Dixie Power Company.—Stock in this company is sold by employees through personal solicitation of consumers. No commissions are paid and no advertising is used.

Great Western Power Company.—This company maintains a separate stock sales department, salesmen being paid entirely on a commission basis. Regular employees cooperate with stock salesmen without special compensation. Newspaper advertising and stock sales bulletins are prepared and used by the stock sales department. No commissions are paid other than those to salesmen. Commissions average about two points.

Idaho Power Company.—The large increase in customer owners in this company in 1923 was accomplished through two special stock campaigns conducted by the employees of the company. Newspaper advertising and bulletins were used during the campaigns. Commissions paid to employees vary with the number of shares sold to any one subscriber.

Los Angeles Gas & Electric Corporation.—Stock is sold by employees, banks and licensed brokers. Newspaper advertising and stock circulars are used to advantage. A commission of 50 cents and \$1 per share is paid depending upon the number of shares sold.

Northwestern Electric Company.—This company maintains a separate stock sales department in charge of a stock sales manager. The manager is paid a flat sum per share for every share sold, from which he pays for newspaper advertising, circulars and the commissions of salesmen and employees. Stock salesmen receive \$3 and employees \$2.50 per share sold. The operations of the stock sales department are carefully supervised by the management.

Pacific Gas and Electric Company.—The fundamental activities of the stock selling campaigns of this company follow:

- A. Bringing prospects into offices
 1. By circularization.
 2. By newspaper advertising and reading notices.
- B. Teaching offices how to handle these prospects
 1. By personal contact with head of stock sales department.
 2. By circulars giving facts and selling arguments.
 3. By keeping a personal representative of the manager of stock sales moving among the district offices.
- C. Keeping the organization enthused
 1. By assigning quotas to divisions.
 2. By paying small commissions to employees.
 3. By stimulating and informative bulletins issued from time to time.

The commissions paid to employees are \$1 per share for the first five shares and 25 cents for each additional share over five. In addition \$1 is paid for each new subscriber irrespective of the number of shares sold.

Pacific Power & Light Company.—All sales in this company are made by regular employees, who are organized into competitive teams of about twenty-five members. Intensive campaigns of about three months' duration are put on each year. Campaigns are accompanied by newspaper advertising, posters which are displayed in district offices, and stock circulars. Employees are given team prizes and individual bonuses. Maintenance of a strong spirit of team rivalry has been an important factor in the success of the campaigns. On cash sales employees are paid \$3 for the first share and 50 cents for each additional share. On sales made on a time payment basis \$2 is paid for the first share and 50 cents for each additional share, due on the payment of 40 per cent of the subscription.

Portland Electric Power Company.—This company maintains a stock sales department under the direction of a stock sales manager. Salesmen are also employed. Employees work in conjunction with this department. Newspaper advertising is used. A house-to-house canvass is made of all consumers. Commissions range from \$1 to \$3 per share for employees and from \$2.50 to \$3 for salesmen, depending upon the number of shares sold to one subscriber.

Public Service Company of Colorado.—The year 1923 marked the launching of this company's customer-ownership program. A detailed description of the methods employed in the one campaign staged during that year appeared in the *Journal of Electricity* for Feb. 15, 1924. Employees were divided into two armies and these into teams. A house-to-house canvass of consumers was made. Employees were furnished with the names of prospects where they had none of their own. The campaign was highly successful. A commission of \$2 per share was paid and in addition \$5 was paid for each new subscriber. Extensive newspaper advertising and direct-by-mail literature was used, all of which is described in the issue noted above.

Puget Sound Power & Light Company.—The stock selling activities of this company are handled through a distinct organization known as the Puget Sound Power & Light Securities Company which was organized in 1923 for the selling as well as the re-purchase of stock. Employees cooperate with the salesmen of the Securities Company. An extensive advertising campaign in city dailies and country weeklies has been consistently followed. Posters are displayed in district offices and other company buildings. Leaflets with a return postal are mailed out with monthly statements to consumers. Prospect cards are prepared for employees to follow up. Salesmen receive \$2 per share commission. Employees receive \$3 for the first share to new stockholders and 50 cents for each additional share.

San Diego Consolidated Gas & Electric Company.—Stock is sold to consumers by regular salesmen and employees through personal solicitation. Newspaper advertising is employed during January and July when special stock sales efforts are made. Customers' gas and electric bills are also used for advertising purposes. Employees are paid a commission of 1 per cent and salesmen receive 2 per cent.

San Joaquin Light & Power Corporation.—The entire San Joaquin Power organization takes part in the stock sales efforts of that company. Supervision of the stock sales is in the hands of a manager. During 1923 the plan followed was to assign definite quotas to each district, the larger districts being in turn subdivided into departments. Two special campaigns were staged during the year, the first taking the form of a baseball series with each district as a team and the second, in the fall, following out a football schedule. Special rules were devised and considerable competition worked up between districts. The company uses newspaper and local magazine space for advertising. Special bulletins are also prepared. Commissions of \$1 for each new subscriber plus \$1 per share for the first ten shares and 50 cents per share for all over ten shares. On sales to old subscribers a straight commission of 50 cents per share is paid. For the district averaging the greatest number of shares per sale for the period Jan. 1, 1924, to May 31, 1924, a bonus of 25 cents per share on all shares sold in the district during that period was paid. As a special consideration, the manager of each district that averages its monthly quota for the first five months of 1924 will be sent to the Pacific Coast Electrical Association convention. Special prizes are awarded the salesman and the saleswoman attaining the highest totals during the year.

Southern California Edison Company.—This company has developed its customer-ownership activities to the highest degree. Briefly the plan followed is:

1. Have the employees themselves first become stockholders in the company by purchasing stock on an easy payment plan.
2. Appropriate stock selling advertising is run in all metropolitan and country newspapers in the territory served.
3. The employees during their spare time interview friends, relatives and neighbors in regard to the purchase of stock, having literature, subscription blanks, etc., with them at the time.
4. A sticker is put on all bills sent out to consumers calling attention to the company's stock and its investment possibilities.
5. About once a year every consumer is circularized with appropriate literature.
6. Each district puts on a stock selling campaign with employees divided into teams of five, ten or twenty men and women. Each district has a definite quota of shares or new stockholders to obtain and these are divided among the teams.
7. All district office windows have stock selling posters and literature on display to attract the attention of the general public.
8. The company has about 25 security salesmen operating under the stock sales manager, who devote their entire attention to stock selling.

9. Permission is obtained from factories to allow an Edison representative to address employees during the noon hour on how the Edison company is building up the community and how the company raises one-third its money through the sale of stock. When the talk is completed permission is usually obtained to allow security salesmen to talk to the individual employees. This method of getting the working man of moderate means interested in the company's securities has given very good results.

The commissions paid on stock sold by employees average 50 cents per share.

Southern Colorado Power Company.—Stock sales are handled entirely by the employees of this company. Liberal newspaper space is used and customers are circularized from time to time. Each division or district manager has charge of the sale of stock in his territory. A commission of \$2 per share is paid.

Washington Water Power Company.—The public relations department is charged with the supervision of the sale of stock of this company. Five special salesmen are employed who devote all of their time interviewing customers and citizens residing in the territory with a view of interesting them in the securities of the company. A maximum of ten shares to any one person has been set. Salesmen are guaranteed \$150 per month plus a commission of 50 cents per share. Employees are paid 50 cents per share on all tips which result in sales.

Western States Gas & Electric Company.—An investment department is maintained for disposing of the stock of this company to the public. The department consists of a manager, secretary and four salesmen. The manager and secretary are salaried employees. The salesmen work on a commission basis.

Great care has been devoted to the preparation of advertisements by the companies and some highly creditable copy has been run in the newspapers of the eleven Western states. Some of the companies have prepared advertising series which have been used on a regular basis. Similarly the stock sales literature distributed to consumers and public has been excellent. Samples of both newspaper copy and bulletins are shown herewith.

All of the companies have adopted the practice of selling their securities both to the public and to their employees on an easy payment basis. Small down payments are exacted and the balance is made payable over a period ranging from ten months to two years. The advantage of this plan is self-evident. One of the chief sales arguments has been that utility stocks are easy to buy on this account.

Figures on the cost of selling stock to the public vary, depending, seemingly, upon the method adopted by the particular company and the length of time such activities have been pursued. Those companies which have followed the customer-ownership plan for a number of years show a very low cost, while those which have just undertaken the work must pay high development costs. One large utility shows a selling cost per share of but 88.5 cents. In one or two cases this cost reaches \$7 or more. A fair average for all of the companies is \$4.50.

Irrespective of the cost, the fact remains that utilities have benefited since the introduction of the customer-ownership idea. Better public relations, an increased public interest in the utility's welfare and a sounder financial position due to the increased distribution of junior securities are but a few of the beneficial results. It is safe to say that 1924 and each succeeding year will see a greater democratization of public utilities as more and more of their consumers are taken into partnership.

Electricity Versus Oil for Heating Iron Enameling Furnaces

By H. A. Mulvaney

Designing Engineer, Electric Sales Service Company, Berkeley, Calif.

THE first electric furnace ever installed for enameling cast iron ware was put into operation in the plant of the Pacific Sanitary Manufacturing Company, at Richmond, Calif., in December, 1920. This furnace was an experiment, having been built in the muffle of an old oil-fired furnace to check computed figures on radiation and conduction losses and to demonstrate the possibility of using an electric furnace in this industry.

The experiment was sufficiently gratifying to warrant the construction of a permanent electric furnace for enameling tubs. The first furnace was of 150-kw. capacity, capable of operating continuously at a temperature of 1,800 deg. F. The design of this furnace has been modified only slightly in subsequent furnaces, and the electrification of this enameling room has continued until it has a load in enameling furnaces of 1,350 kw.

The process of enameling a tub starts with the spraying of the thoroughly cleansed and sand blasted casting with a so-called "ground coat" which consists of a suspension in water of powdered glass, clay and other materials. When the "ground coat" has dried the tub is placed in the furnace, which is heated to a temperature of 1,800 deg. F. until the ground coat is thoroughly fused, forming a thin layer of transparent glass on the casting. This operation takes from seven to ten minutes. The tub is then withdrawn from the furnace and immediately coated by means of long handled sieves with a layer of opaque white powdered glass, known as the "cover enamel." After having cooled to about 800 deg. F., the tub is returned to the furnace for three minutes, during which time the cover coat fuses to a smooth layer. A second cover coat is applied in the same manner and the tub is again withdrawn and inspected, and if it is free from bubbles and blow holes it is allowed to cool as a finished article.

The enameling of a tub is an operation requiring skill and judgment since each coat must be evenly distributed and the tub removed for each operation at the proper temperature. The operation requires three men; an enameler, whose duty it is to enamel the inner portion of the tub, a rimmer, who enamels the rim and withdraws the tub from the furnace,

ELECTRICITY continues to demonstrate its practicability in new fields. Wherever heat is required it is found that electricity is taking the place of other kinds of fuel. In this article, Mr. Mulvaney makes some interesting comparisons in costs of operation and results obtained in the use of electrically heated enameling furnaces and of those in which fuel oil furnishes the heat, at the plant of the Pacific Sanitary Manufacturing Company, Richmond, Calif.

and a wheel-turner, who rotates the tub on a table during the enameling process. The tub is taken to and from the furnace by a swing fork, hung from a beam arranged with a lever arm so balanced that it may be handled by one man.

Cast iron enameling, previous to this installation, had been carried on in this plant in oil-fired muffle furnaces. In the muffle oil furnace, combustion takes place under the floor in the flues. The combustion gases

pass up and around the muffle, which is made of cup brick to facilitate conduction, and into the stack, and do not come in contact with the ware. The undesirable features of such a furnace are its rapid rate of depreciation, its inability to maintain uniform temperature, and its uneven floor due to the sagging of its fire box. The cause of this last defect is that to maintain a temperature of 1,800 deg. F. in the muffle, the temperature in the fire box is above the working limit of ordinary refractories. The destruction of such a furnace is quickened further by the impact of a 240-lb. tub on the floor nine or ten times per hour. The floor in such a furnace consequently begins to sag the first week of operation and has to be replaced within four to eight weeks. The rail of the buck, upon which the tub is placed, will follow the uneven floor, and if the tub is not uniformly supported, it will warp.

This defect in an oil furnace can be readily overcome in the electric furnace; but the electric furnace presents difficulties of an entirely different nature. The first requirement is that the temperature of the muffle must be held at 1,800 deg. F. To maintain such a temperature nickel-chromium is the most desirable material for the electric element. Previous experience with this alloy has demonstrated that in large cross-sections it can be operated for a number of years at a temperature of 1,900 deg. F., but if this temperature is exceeded in any part of the element, frequent replacements will be necessary. Since replacement of an element requires the cooling down of the furnace to a temperature at which it may be entered, it is quite evident that frequent replacements would cause costly shut-downs and would make an electric furnace impossible in this industry. Another difficulty to be confronted is the frequent

breaking of a tub within the furnace. The elements have to be protected so as to prevent the broken ware from coming in contact with them, or a low enough voltage applied to the elements to prevent serious difficulty.

Features of Single Oven Electric Furnaces

Electric furnaces with but a single door, which are now used for enameling small ware, have inside dimensions of 10 ft. 1 in. wide by 10 ft. 4 in. long. The spring of the arch is 16 in. above the floor and the center of the arch is 4 ft. 6 in. above the floor. The inner walls of the furnace are made from a special supporting brick which holds the ribbon element in place. There are eight elements in the arch, two in the side walls and three in the floor. Any one of these elements may be disconnected to permit temperature adjustment within the furnace, and the voltage applied to the elements may be varied from 40 to 80 volts in ten-volt steps. With such an arrangement the voltage may be adjusted and held constant to suit any weight of ware to be enameled.

The furnace side walls, back and arch, are surrounded with 10-in. infusorial earth which is held in place by a 9-in. outer wall of brick. This construction makes the heat loss due to conduction and radiation very small, the greatest being around the doors. The maximum power input is 150 kw., though 200 kw. may be obtained by a system of voltage taps. Three of the above type furnaces, constructed by the Electric Sales Service Company, Berkeley, Calif., are now in operation at the plant of the Pacific Sanitary Manufacturing Company and two are being used at the plant of the Santa Fe Foundry Company. Some of these furnaces have now been in continuous operation for three years.

Double Chamber Muffle Oil Furnaces

In some plants in the East, double chamber furnaces are used, in which the firing is all done on one side. Part of the product of combustion passes under the floor of both chambers and up the fire wall of the second. The other part passes entirely over the top of the first chamber, through the division wall near the floor level, and up the inner side of the second chamber. The first chamber is always a muffle, but the second usually is operated as a semi-muffle furnace.

The final melting of the ground coat and all the baking of enamels is conducted in the first chamber, which is kept at ordinary enameling furnace temperature. The second chamber, which is at a dull red heat, is employed for preheating the tubs, covered with a ground coat, to dull redness. Such a furnace, although economical in fuel consumption, is hard to control as to temperature, and the maintenance is high, so it has not proved popular.

Construction of the Duplex Furnace

It is evident that if two small furnace chambers are built within the original area of one, two furnaces with the radiation loss of but one are secured. The door loss from two doors is present but if the furnaces are used for tubs only the doors can be made small, thus cutting down this loss. With two

high temperature chambers available, one tub can be undergoing the finishing process while another is heating. In such a furnace it should be possible to double the production with the same number of man hours, by an increase of 50 per cent in electrical energy.

In locating heating units in such a furnace, seven elements are installed in the arch, two on the side wall, two on the center partition and six on the floor. Any number of these elements may be disconnected. The six floor elements are on magnetic contactors, and in practice it is customary to connect three of these six elements on an automatic temperature control.

Operating Characteristics

One of these duplex furnaces has been in continuous service for eighteen months and although the production has not been doubled by the use of the duplex electric furnace, a 50 per cent increase in production has been obtained on standard tubs and as high as 75 per cent more of certain special tubs has been turned out with the same number of man hours. The enameling crew works six hours on the duplex furnaces and produces more ware on the 6-hour shift than was formerly produced in eight hours, and since the enamellers are paid on a piece-work basis, the 6-hour shift does not increase the cost of labor.

There is no question but that electric energy is the ideal heating agency for enameling furnaces, due to the long life of the furnace, the cleanliness with which it can be used, and the possibility afforded by its use for temperature control within the furnace and the accurate automatic control of the mean furnace temperature. The problem therefore is an economic one. Can electrical energy be obtained at a cost so that the manufacturer using it can compete with the manufacturer using other types of fuel? It is believed that it can on the West coast, and the following figures on fuel costs in furnaces using oil and electric energy are presented to bear this out. In making this comparison it is necessary to consider the amount of production obtainable from each type of furnace, and also other costs inherent in each type, such as maintenance and depreciation, so that the cost per unit of work may be obtained.

Production and Costs Compared

For the purpose of comparing the production from each type of furnace, the standard 5-ft. tub only is considered, but the results obtained in tub production could be assumed to approximate the same proportion in other kinds of work done. The average number of 5-ft. tubs obtained from an oil-fired furnace in the plant described above was eighteen per 8-hour shift. When this average was increased the life of the furnace was greatly decreased. In comparing these results with those obtained in other plants, by referring to the U. S. Department of Commerce Bulletin No. 142, by Homer Staley, page 159, it may be found that the time allowed on tubs weighing between 200 and 300 lb. was 30 minutes, or a production of 16 tubs in eight hours. Due to the low temperature in the front end of oil fur-



ELECTRIC enameling furnaces used by the Pacific Sanitary Manufacturing Company and the Santa Fe Foundry. Three 250-kw. duplex furnaces, each with a 24-hr. capacity of 100 standard tubs and two 150-kw. small ware furnaces may be seen at upper right and center, respectively. At lower left is a night view of a furnace that has been in continuous operation for 18 months. Note excellent condition of floor.



naces, it is common practice to remove the tub during the first heating to rotate it. This operation is not necessary with the electric furnace because of the even temperature maintained throughout, and therefore at least two more tubs per shift can be obtained from an electric furnace.

To arrive at the cost of maintenance of the electric furnace it is assumed that it will be necessary to replace all the heating elements in three years, and the maintenance and depreciation on this type of furnace has been placed conservatively at \$37.50 per month. The useful life of an oil furnace is three years and its cost is \$3,000. Replacement of the floor is necessary six times a year, at a cost each time for labor and material of \$130. The total depreciation and maintenance, therefore, is about \$150 per month. Furthermore, since the oil furnace floor warps and settles within the first week of operation, and since heating the tub slightly above the desired temperature causes it to take the shape of the supports, there is great danger of obtaining warped ware from such a furnace, and there must be added to the costs a loss covering this warpage. After considering reports by other investigators treating this subject, this loss has been placed at \$60 per month.

The cost per tub, therefore, on each type of furnace, using the price of oil at \$1.40 per bbl., and of electricity at 8c. per kw-hr., is figured as follows:

Muffle Oil Furnace

Oil consumed per 24-hr. operation of tub furnace	11 bbl.
Oil consumed per 24-hr. for atomizing	2.5 bbl.
Total consumption for 24-hr. period.....	13.5 bbl.
Oil consumed in 25 working days per month, 13.5 x 25	337.5 bbl.
Oil consumed in 4 Sundays per month, 8 x 4.....	32 bbl.
Total oil consumed per month.....	369.5 bbl.
Cost of oil per month, 369.5 x \$1.40.....	\$517.30
Cost of maintenance and depreciation per month....	150.00
Cost due to warpage per month.....	60.00
Total operating cost of furnace per month.....	\$727.30

Based on a production of 57 tubs per 24 hours, and figuring 25 working days, a production of 1,425 tubs per month is secured from the muffle oil furnace, at a cost of 51c. per tub.

Duplex Electric Furnace

Average monthly electric energy consumption equals 133,000 kw-hr.	
Cost of electric energy, 133,000 x \$.008.....	\$1,064.00
Cost of maintenance and depreciation.....	37.50
Total operating cost of electric furnace per month	\$1,101.50

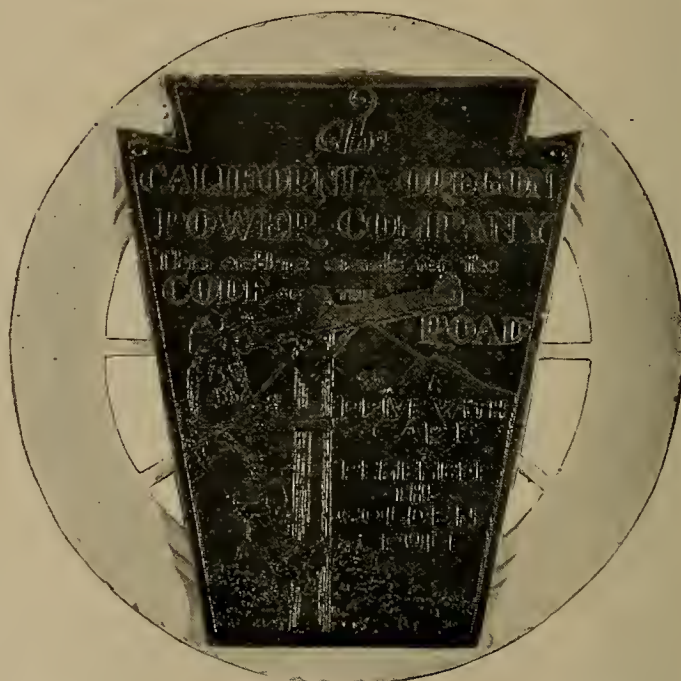
Based on a production of 96 tubs per 24 hours, there is a monthly production of 2,400 tubs from the electric furnace, at a cost of 45.8c. per tub.

In the above comparison the electric furnace is not credited with a better product nor with the reduction in rejected ware during the enameling operation, and yet the electric furnace does produce this desirable result. Due to the lack of reliable data it is extremely difficult to make a comparison in dollars and cents, but the principal factor in the economy in the use of the duplex electric tub furnace is the increase in production obtained with the same number of men as was formerly employed on a single oil furnace.

Recommending Safety and Courtesy to Company Car Drivers

DEVELOPED along much the same lines as the telephone plaque advising users of the instrument to "Say It with a Smile," that The California Oregon Power Company inaugurated some months ago, is an emblem designed for use on the automobiles of that company. The Medford, Ore., utility has attached the new emblems to all company cars in order that safety first may be the motive of each driver. The automobile emblem is also designed to encourage a spirit of courtesy among employees who are driving company cars upon the road.

The new emblem is in the shape of a keystone, the company's emblem, and is made of brass and is etched in black to form the background for the illustration and lettering. The face of the emblem carries a view of a mountain range with a lineman working on a pole in the foreground.



The emblem, reproduced above, is of metal and is permanently attached to the instrument board of the automobiles owned by The California Oregon Power Company.

The "Code of the Road" emblem is attached to the dashboard of each company car and truck in order that it may be in plain view of the driver at all times. The suggestion to "Drive with Care—Remember the Golden Rule" is a constantly visible reminder that has been found to be most effective in reducing accidents and in developing a spirit of courtesy on the road.

The emblem has not only reacted favorably among the employees of the company but has also elicited a large amount of favorable comment from those of the public that have seen it. By showing that it is anxious to serve its customers courteously and to care for the safety of the general public The California Oregon Power Company has increased the good will in the community where it operates, at exceedingly low cost.

A Proposed Plan for Improving and Increasing Electric Appliance Sales

By George W. Barker

Associate Editor, Journal of Electricity

AT the close of 1923, one of the McGraw-Hill papers made an investigation of electric appliance sales. A careful study was made of the growth of the entire country, this study including population increase; increase in number of wired homes; amount of electric energy generated; residence load; number of telephones in use; number of automobiles registered; sales of general lines of manufactured products and sales of electric appliances. The period of the investigation embraced the years 1920 to 1923, inclusive.

This study did not reflect credit on the electrical industry. Instead, it showed that of nearly all the major businesses of the country, the electrical appliance business almost alone had fallen behind in percentage increase; had, in other words, allowed the competition of other business to outstrip it and to interrupt its logical growth. The number of automobile licenses issued had increased fifty per cent in 1923 over 1921; iron and steel production increased forty per cent in 1923 over 1922; copper production increased fifty per cent; automobile production increased sixty per cent; leather increased ten per cent; and yet—the electric appliance penetration at the end of 1923 was actually two per cent less than at the end of 1922, and 1922's penetration was two per cent less than at the end of 1921.

Now, this was not because of a decrease in the number of possible customers. On the contrary, the total residence consumers at the end of 1923 was 9,903,828, or 1,353,828 more than at the close of the preceding year. This increase in consumers alone offers an attractive prospect list, even without regard to the millions of previously existing consumers who have not yet purchased all of the appliances in common use. Further, it takes no cognizance of the 8,175,510 homes in front of which the power companies' lines pass but which are still to be wired for electric service. In the face of these figures—which are as accurate as may be obtained and which were compiled from many sources, including the U. S. Department of Commerce—one can hardly say, with justice, that the failure of the electric appliance business to maintain its stride is due to a decrease in the

WITH the broadening of the channels of distribution of electrical appliances and with the increase in the variety of these devices, a situation has arisen which demands the immediate attention of the industry. Ignorance of the commonest characteristics of such equipment on the part of salespeople handling them has resulted in loss of sales and in dissatisfaction on the part of consumers. This article outlines a plan for educating the salesman and saleswoman who place appliances in the hands of the public.

number of prospects or to unfavorable business conditions.

The logical deduction to be made would seem to be that the electrical appliance merchandising set-up has failed. It is not a pleasing indictment to answer. No other deduction, however, seems possible. Manufacturers in other lines, covering the same territory, showed increases for one year of ten to sixty per cent, and yet the electric appliance saturation has dropped two per cent a year

for each of the past two years. This does not, of course, mean that the gross volume of electrical appliances has decreased; on the contrary, it increased roughly \$250,000,000 in 1923 over 1922, which latter year showed a decrease of approximately \$67,425,000 from the gross volume of 1921. These volume figures on appliance sales may be accepted by the most skeptical for they were compiled from conservative estimates made by some four hundred authorities in their particular lines.

Why Retail Sales Do Not Keep Pace

The question naturally arises—"Why does this condition exist?" A seeker for the truth must face the facts and from these facts must draw his conclusions. With this thought in mind, a careful study of electric appliance merchandising has been made by the Journal of Electricity, particularly with reference to the sales efforts put forth by clerks, solicitors, proprietor-salesmen and all others who take part in retail selling. This investigation of sales procedure brought forth many startling facts, the chief of which is that many retail sales employees are woefully, sometimes almost hopelessly, ignorant of even such elementary information as the proper application of electric appliances. The amount of misinformation observed is appalling. It is small wonder that appliance sales are decreasing in percentage. Within the scope of this investigation 660-watt heaters have been sold to heat a house, heating pads have been passed out to serve the purpose of warming quilts, waffle irons have been advocated as table stoves, immersion heaters of the lamp socket type have been recommended for "quickly" boiling a gallon of water, a grill stove has been declared to be

capable of roasting, toasting, boiling, baking and broiling at one time, and one has been told that one did not want to buy an electric ironer because "it costs too much to operate." Perhaps, after all, the marvel should be not that appliance saturation is lowering at the apparent rate of two per cent a year but, rather, that the rate is not much greater.

Education of All Sales Forces Proposed

The apparent cause of this condition being ignorance on the part of sales forces, it is only logical to take steps to overcome that ignorance. This can be done in only one way—by education. A systematic plan embracing fundamentals of electric appliances—as to types and applications, not as to technicalities—seems the surest and quickest method of placing electric appliance sales effort on a sure footing. It seems, too, to offer the elimination of poor selling—of selling the wrong device for a specific purpose, or of misrepresentation through ignorance. It should make for honest, intelligent sales effort and should result in increased satisfaction in appliance use. This, in turn, will make itself felt in increased appliance sales and there will be the satisfaction to all concerned that always accompanies good merchandise, honestly sold and properly applied.

Such a plan, worked out in detail and broadly applied on a national scale, cannot fail to improve the character of sales effort and must result in a more intelligent service to the consumer. Any plan that will accomplish these two purposes cannot fail to achieve results.

Based upon the observations made in this trade survey and shaped to the needs of the trade as learned from the study of trade practices, an outline has been prepared to show what the electrical appliance industry must do to solve the problem. It appears that unless some such plan is put into effect within a relatively short time, the appliance sales volume will be even more affected than it has been during the past few years. Inasmuch as many people become familiar with electricity through the use of domestic appliances it is at once apparent that the present situation is of concern to all branches of the electrical business. Therefore manufacturers, jobbers, dealers, constructionists and all others should alike give heed to the need for this instructive effort. The plan in its fullest operation will, of course, be costly, but reduced sales volume will be more costly still. The past two years have already proved the trend of sales with the retail selling force in its present unguided state. The expense, when divided fairly, will be but a slight burden on any branch of the industry and should bring returns far beyond the cost.

With this thought in mind the following analysis of the situation is presented. It is recognized that this is fundamental only and that the many details of application must be worked out before the plan functions fully. However, this is a foundation on which to build a working schedule of appliance information that, it is hoped, will serve to enlarge the service to the consumer, increase the satisfaction to be derived from the use of electric appliances,

promote intelligent and honest selling and multiply volume.

National Organizations to Direct Work

It is apparent that the first requisite is for the National Electric Light Association or the Society for Electrical Development to recognize the existing situation above mentioned. Evidences of the condition abound on all sides in every city and town and in all stores retailing electric appliances. The condition having been recognized and acknowledged by one of the national cooperative organizations, that organization should cooperate with the other large organizations of similar nature, and with local geographic organizations, in preparing informative bulletins for distribution to employees within the scope necessary. These bulletins should be short and pithy, preferably of one page each, and should be divided into the various series into which electric appliances naturally are classified; for example, socket devices; ranges, water heaters, air heaters; labor-saving devices, such as washers, ironers, vacuum cleaners, dish washers, etc., miscellaneous devices, such as violet ray machines, hair dryers, utility motors, etc. These classifications may also be made in accordance with that part of the home in which they are most liable to be used; for example, kitchen devices; laundry devices; toilet devices, etc.

Character of Information Required

The bulletins should be interestingly prepared in simple language refraining, so far as possible, from technicalities. They should generally be illustrated with a **type** of the device under discussion but should **not** be made propaganda for an individual manufacturer. The bulletins should be numbered serially and should be in such form as to permit binding in a loose-leaf binder. The subject matter of these bulletins should include application of the device described, wattage, voltage, whether or not special wiring is required, finish or finishes, price ranges, special appeal of the device to men or women, cost of operation at a unit rate for energy (this unit rate to be, perhaps, the average rate for the entire country for the service on which the device is most liable to be used). Any other information pertinent to the device or considered desirable of presentation may also be incorporated.

Proper Wiring Informaion Needed

These bulletins should also contain reference to the need for adequate convenience outlets in order that appliances may be **conveniently** used. The safety factor involved in the use of convenience outlets should also be stressed as should be the danger of using appliances connected to lighting fixtures where these fixtures are overhead or on a side wall.

Special attention should be paid in these bulletins to the matter of adequate wiring, not only for socket devices but also for the use of appliances that may be purchased in the future. Particular effort should be made to tell of the need for proper provision for wiring, or at least for conduit—both entrance and distribution circuit—for the present or

future use of an electric range, water heater or air heaters.

Plan of Distribution

These bulletins should be issued at regular and frequent intervals in order to stimulate interest in the subject matter involved. Distribution should be to all sales and public-contact employees, and members of the organizations enumerated below and at no cost whatsoever to the recipient. Distribution may be handled in such a manner as to ensure the relative effectiveness of the literature. If a charge is made to the employee for this material the field of distribution will be very materially narrowed and the value of the whole effort will be minimized. The plan of distribution without cost to the employee will make for maximizing of the success of the endeavor and should result in improved sales efforts.

Distribution of this material should be through the following channels:

- (a) Jobbers—Electric, hardware, household goods, drugs
- (b) Dealers—Electric, hardware, household goods, drugs, furniture
- (c) Central stations
- (d) Manufacturers' agents—Electric, hardware, household goods, furniture, drugs
- (e) Architects
- (f) Builders
- (g) American Institute of Electrical Engineers
- (h) Apartment house owners' associations
- (i) American Federation of Labor
- (j) International Brotherhood of Electrical Workers
- (k) Such other outlets as deemed advisable or desired

Distribution should be in accordance with the following general plan:

- (a) Nationally by the National Electric Light Association; the Society for Electrical Development and the Joint Committee for Business Development.
- (b) Geographically by the state or geographic cooperative campaigns or associations.
- (c) By manufacturers, jobbers and other groups that desire to avail themselves of this service and who would buy the bulletins at production cost.
- (d) The information to be compiled into interesting composite papers for presentation by radio.

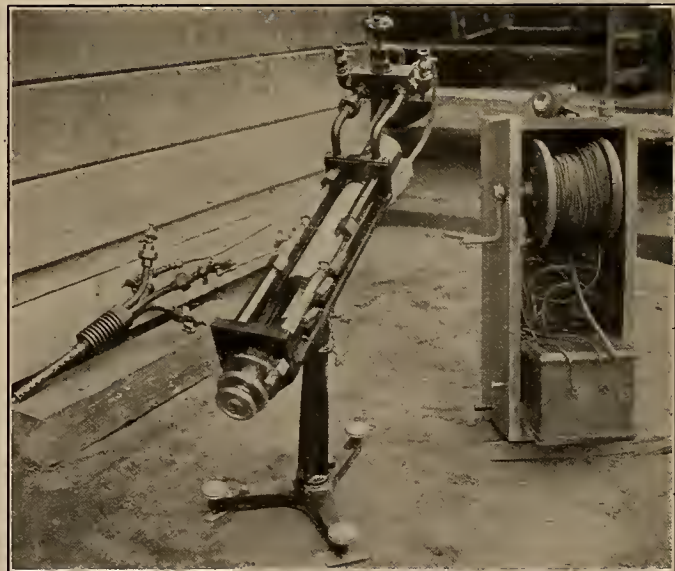
From the above brief outline of the plan proposed for the relief of the situation it is evident that the cost of the plan will be spread out over the entire industry, those agencies that are most able to do so standing the major expense. This expense, in quantity production, will doubtless be much less than at first appears. It should, even at the highest figure, be less than the present losses that result from weak, unintelligent and often deliberately untruthful sales effort. No charge is made that the untruthful effort is inspired but there is no denying that it does exist. Education is a cure for ignorance, which very easily may be taken as the cause for the present condition.

Such a plan, properly functioning, should serve to increase employee interest in electric appliances, to improve sales effort, to produce greater consumer satisfaction and to develop volume. It should, too, place appliance sales on a firmer foundation and should result to the betterment of every branch of the electrical industry.

Power Company Diagnoses Pump Troubles for Farmers

AS a service to the farmers of the San Joaquin Valley where electric pumping is the chief source of water for irrigation, the San Joaquin Light & Power Corporation has recently established a department for pump testing along the lines of a similar department maintained by the Southern California Edison Company. The company maintains the necessary apparatus for obtaining complete data regarding pump efficiency, motor characteristics and other means of improving operating conditions. The information brought out by tests conducted so far has proved to be of great value to farmers, pump manufacturers and power companies.

The over-all efficiency of the pump is calculated from the discharge, the power input and the measured lift. Where weirs, concrete reservoirs or tanks are installed at the plant the discharge can be measured easily enough. However, many plants discharge directly into pipe lines and in such cases a General Electric flow meter is used. The power input is ordinarily determined by timing the revolutions of the meter. The lift is determined in several ways, depending upon the character of the installation. Where water is discharged at a higher level a calibrated



General Electric flow meter used in making tests of electric pumping installations in the San Joaquin Valley. Sounding apparatus for electrically determining the water level in deep wells is shown at the right.

pressure gage is used. When deep well turbines are installed in well casings a small electric sounder is lowered by means of a steel tape. In some cases the water level is determined by air pressure.

Tests made so far indicate that there are three principal causes of trouble in a pump installation. The first is that there has been a change in operating conditions since the installation of the plant, the second is pump wear and the third is that the proper design of pump is not used. Seldom has it been found that the power service is at fault.



Electrical Construction

By E. Earl Browne

FOR those who do not desire to use a form with the materials printed on a labor and material listing sheet, it is convenient, when reading the specifications preliminary to counting the outlets, switches, signals, and measuring up the service, sub-feed and circuits, to have a reminder sheet such as is shown in Fig. 6. This covers all the high spots of most of the jobs and by checking over with the final labor and material list it is possible to pick up all the larger items which might have been omitted from the estimate. A summary sheet as shown in Fig. 7 is particularly valuable in reminding the estimator of incidentals such as inspection, painting, freight and cartage, board and lodging, traveling time and traveling expense.

The objection to so many sheets of paper and forms for the ordinary job is that it is very easy to lay aside and omit one of the material and labor sheets from the summary unless the estimator is careful to number all sheets as they are used.

In taking off a job from plans and specifications, it is the hidden clauses which must be guarded against, and it is for this reason that more than a casual glance must be given to specifications. It is a common occurrence in general contract specifications to incorporate a paragraph following the electrical work about as follows:

"FIXTURES.—The sum of \$500 is to be allowed by this contractor for electric lighting fixtures. Same to be selected by the owner and paid for by this contractor."

It would seem that this is separate from the electrical specifications, but as it immediately follows them and has no general heading it is well to qualify that you have or have not included the fixtures, as there is then no chance for an argument between yourself and the general contractor. There is another sentence that is often added to the same paragraph, i.e., "Same to be selected by the owner but paid for and installed by this contractor." This item of installing and paying inspection fees for such installation amounts to at least 75 cents per fixture, and, perhaps, two or three times this amount, particularly if it be a job where the fixtures are sent "knocked down" to save expense in packing and freight.

The paragraph in all specifications which states that "all work is to comply with all local, state and Board of Fire Underwriters' rules," does not permit the electrical contractor to claim an extra if local switches in bathrooms, kitchens, and laundries, are

ESTIMATE

NO. _____ DATE _____

JOB OR BLDG. _____

LOCATION _____

ARCHITECT _____

ADDRESS _____

ENGINEER _____

ADDRESS _____

OWNER _____

BID TO ARCHT. ENGR. OWNER SUB. SEE MR. PHONE

BID TO BE IN BY _____ ADDRESS _____

PLANS: _____

SET NO. _____ DATED _____

SCALE _____

SPECIFICATION NO. _____ DATE _____ PAGE NOS. _____ INTERLINED ON PAGE _____ CORRECTED ON PAGE _____ INSERT AT PAGE _____

ADDENDA NO. _____

BUILDING _____ KIND _____ AREA _____ COST OF BLDG. _____ COST OF FLOORS _____ NO. OF FLOORS _____

SPECIFICATION REQUIREMENTS

PAGE NO.	DESCRIPTION	PAGE NO.	DESCRIPTION	PAGE NO.	DESCRIPTION
1	GENERAL CHECK	1	PLUG RECEPTACLES	1	ANNUNCIATOR SYSTEM
2	BOND	2	SPECIAL OUTLETS	2	BELL AND BUZZER SYSTEM
3	PRO-RATA CHARGES	3	LTS. PANELS	3	NURSES CALL
4	INDUSTRIAL CONTRACTOR PUBLIC FIRE	4	PWR	4	MESSENGER CALL
5	WATCHMAN	5	SPECL.	5	WATCHMAN'S
6	TELEPHONE	6	SWITCHBOARDS	6	AUTO-CALL
7	DRAWINGS	7	LTC FUSES	7	TELAUTOGRAPH
8	CUTTING AND PATCHING	8	PWR	8	SPECIAL
9	INSPECTION	9	MOTOR SWITCHES	9	ALARM BUREAU
10	LICENSE	10	SETTING	10	FIRE
11	STORAGE	11	CONNECTING	11	SPRINKLER
12	SERVICE A.C. D.C.	12	COVER SOCKETS	12	SPECIAL
13	OVERHEAD UNDERGROUND	13	DROP CORDS	13	DICTAPHONE
14	LTD. WIRE VOLTS	14	METERS	14	PHONES PUBLIC
15	PWR. WIRE VOLTS	15	METER LOOPS AND FITTINGS	15	INTER-COM. SPECIAL
16	LOCATION	16	FIXTURES, BATH. 11	16	CLOCKS TIME PROGRAM
17		17	LAMPS, BATH. 12	17	WATCHMAN'S
18		18	HEAVY 13		
19	VOLTS DROP LTD FEEDERS	19	ALLOWANCES		
20	PWR				
21	LTD BRANCHES				
22	PWR.				
23	WIRE S.B. D.B. CODE				
24	CONDUIT BLK. WH.				
25	BRANCH CTS PER CONDUIT				
26	SUPPLY CONDUITS				
27	OUTLET BOXES BLK. A WH.				
28	FLOOR				
29	SUPPORTS				
30	BRICKS				

REMARKS: _____

Fig. 6.

not shown on the plans but are required by the local ordinance.

One of the most important things to guard against is a mistake in using the wrong scale, as many cheap jobs have been taken by contractors who used a 1/4-in. scale when the plan was 1/8 in. and a 1/8-in. scale when the plan was 1/16 in. Sometimes a draftsman is careless and will mark the floor plans 1/4 in. when they are 1/8 in. and it is a good plan to

check the figured dimensions on the plans to be sure there are no errors.

Some regular system in taking off a plan with typical floors should be used in order to be certain that all floors are included in the totals. It is also a good idea when pricing materials to use the same unit throughout, as it is a common error to figure an item on the per thousand basis when it should be on the per hundred basis.

In the May 15 issue of the Journal of Electricity a comparison was made between earlier estimating forms and those of present day use. The number of individual items on the earlier forms totaled 259 as given but the individual classifications of materials are 41. All of these classifications are incorporated in the present forms, described in the above issue, which have eliminated much of the detail and have minimized the work of the estimator.

J O B		EST. No.				
BY	CHECKED BY	APPROVED BY			DATE	
DATA	SHEET NUMBER	SYSTEM	MATERIAL	LABOR	TOTAL	
CEILING OUTLETS						
BRACKET "						
PLUG RECEPTACLE OUTLETS						
CEILING "						
FLOOR "						
FAN "						
DECORATIVE "						
CEILING SWITCH "						
WALL " "						
DOOR " "						
PHONE "						
TOTAL "						
TOTAL LIGHTING WATTS						
CONNECTED CIRCUITS						
NO OF MOTORS						
MOTOR H. P.						
TOTAL LABOR:						
DAYS S						
INCIDENTALS:						
BOND		INCIDENTALS (SEE SCHEDULE)				
PRO RATA CHARGES		NON-PRODUCTIVE LABOR " "				
INSURANCE		TOTAL MATERIAL S				
WATCHMAN		TOTAL LABOR S				
TELEPHONE		COST OF MATERIAL AND LABOR S				
DRAWINGS		25% OVERHEAD S				
CUTTING AND PATCHING		NET COST S				
LICENSE		20% PROFIT S				
INSPECTION		SELLING PRICE S				
STORAGE						
PAINTING		REMARKS:				
FREIGHT AND CARTAGE						
TRAVELING						
BOARD, ETC.						
TOTAL \$						
NON-PRODUCTIVE LABOR						
JOB SUPERINTENDENT						
" CLERK						
HANDLING MATERIAL						
DELAYS & CONDITIONS						
TRAVEL-TIME						
TOTAL \$						

Fig. 7.

A Practical System of Accounting for Contractor and Dealer

By F. V. Mitchell

ALL revenue and expense accounts are closed out into capital account through Profit and Loss at the end of each closing period by journal entry, in accordance with the following illustration:

Acct. No.	Account	Dr.	Cr.
50	Sales	\$27,817.40	
51	Returns & Allowances.....		162.75
52	Cost of Goods Sold.....		18,544.95
60 to 73	Expenses (Detailed)		6,390.50
40	Capital Account (Profit & Loss)		2,719.20
To transfer net profit for calendar year 1923 into capital account.			

From the proven totals of the General Ledger Accounts, we are enabled to prepare an accurate Profit and Loss Statement and a true Statement of Condition of the business at the end of each closing period. Both of these statements are of utmost importance in the successful operation of the busi-

ness as, in fact, without them it is in the identical position of a ship sailing along aimlessly without a rudder and invariably piling up in disaster upon the rocks. It is a proven fact, borne out in the management of all truly successful firms, that there is no safer and saner way to govern a business as to methods of future operations than by the exact results of similar operations in the period just past.

The Profit and Loss Statement as outlined in Fig. 1 contains such vital information as the total amount of Sales, Material and Labor Costs, Gross Profit on Sales, Overhead Expenses, and Net Profit, together with the percentage that each bears to the total sales. It also shows the percentage of Overhead to Material & Labor Costs, which is the most necessary point of information to have in the entire operation of the business, as from this can readily

STATEMENT OF CONDITION
December 31, 1923
ASSETS

Current			
Cash in Bank.....		\$ 962.45	
Petty Cash Fund.....		50.00	
Accounts Receivable	\$2,903.60		
Less: Provision for Doubtful Accounts.....	214.85	2,688.75	
Notes Receivable		200.00	
Merchandise Inventory		1,842.75	
Labor in Process.....		279.85	\$6,023.80
Fixed			
Automobiles	\$900.00		
Less: Provision for Depreciation.....	300.00	\$600.00	
Furniture and Fixtures.....	\$750.00		
Less: Provision for Depreciation.....	150.00	600.00	
Tools and Equipment.....	\$250.00		
Less: Provision for Depreciation.....	50.00	200.00	\$1,400.00
		Total Assets,	\$7,423.80

LIABILITIES

Accounts Payable	\$2,507.65		
Notes Payable	500.00		
		Total Liabilities,	\$3,007.65

NET WORTH

Capital Account		4,416.15	
		Total Liabilities and Net Worth,	\$7,423.80

Fig. 1.

be seen the average percentage that has to be added to material and labor costs to cover actual overhead. Unless this is taken into consideration consistently in compiling estimates for contract bid purposes and a further additional percentage added to insure a legitimate net profit, the business cannot possibly show a healthy condition.

The Statement of Condition as outlined in Fig. 2 sets forth the amounts of the various Assets and Liabilities of the business and the Net Worth, representing the amount that the Total Assets are in excess of the Total Liabilities. The information contained in this statement is not only essential to the management of the business, but without a true Statement of Condition a contractor and dealer cannot hope to obtain a line of credit from the wholesaler nor the proper financial assistance from the bank. As will be noted, the total of the Current Assets in the present illustration is twice the amount of the Liabilities, which is commonly called a two-to-one showing and is considered the low water mark from a credit standpoint. Anything below that ratio shows very conclusively that the business is in an unhealthy condition, and the results of investigations show that in the majority of instances this condition has been due to the lack of knowledge of correct percentage of overhead. From the standpoint of the management this statement shows at a glance just

how much the business has tied up in Accounts Receivable and Merchandise, and what amounts are due in Accounts Payable and Notes Payable, from which information the necessary action can be taken promptly. A comparison of this statement at the end of the period with the one at the beginning will also show the actual disposition of the Net Profit for that period.

The foregoing set of books as outlined has been found by actual practice sufficiently adequate to fit the needs of contractors and dealers doing an annual business up to \$50,000. It has been designed with special attention to simplicity so that the services of a high-salaried bookkeeper are not required to operate it after the system is once properly installed. From the above statements, it is quite evident what valuable information can be obtained from the very simplest set of books to help guide the small electrical store in the right direction as to the profitable operation of the business.

However, the system is also built for expansion and it is the intention from this point to take up the proper methods to provide for departmental segregation on the books and the compilation of detailed job costs, overhead, etc. This detailed analysis has been more practically adapted to contractors and dealers with a volume of over \$50,000 annually, where there are separate department heads, for instance.

PROFIT & LOSS STATEMENT For Calendar Year Ending December 31, 1923

REVENUES			Per Cent
Sales		\$27,817.40	
Less: Returns and Allowances.....		162.75	
Net Sales		\$27,654.65	100
Cost of Goods Sold—Material.....	\$12,032.60		
Labor.....	6,512.35	18,544.95	67
Gross Profit on Sales.....		\$ 9,109.70	33
EXPENSES			
Advertising	\$ 391.70		
Automobile Expense	512.45		
Depreciation	500.00		
Doubtful Accounts	250.35		
Freight, Drayage and Express.....	112.60		
Heat, Light and Power.....	105.85		
Insurance	204.70		
Interest and Discount.....	52.65		
Miscellaneous Expense	54.40		
Rent	600.00		
Salaries (Incl. Proprietor, \$2,400).....	3,300.00		
Stationery, Printing and Office Supplies.....	125.45		
Taxes and License	75.60		
Telephone and Telegraph.....	104.75		
		6,390.50	23
Net Profit,	\$2,719.20		10
Percentage of Overhead to Material & Labor Costs			34

Fig. 2.

Shall the Contractor-Dealer Sell Washing Machines?

A Clear Analysis of the Situation by an Experienced Executive
Who gives Fundamental Details for Successful Dealers

By E. A. NORTON

Manager, Electrical Department, Barker Bros., Los Angeles, California

The solution to any serious problem can be found by analytical consideration of that problem and by applying the experiences of others who have been confronted with a similar problem. The knowledge of what not to do has often saved from disaster. In avoiding the wasteful effort of costly experimentation profits are derived with fewer setbacks. There are, unfortunately, still some members of the electrical industry who will take on additional burdens without hope of profit. However, the majority of contractor-dealers have arrived at the point where they will not follow this practice and where they refuse to increase volume for volume alone. The increase in volume must be accompanied by a corresponding increase in net profit.

Many electrical contractor-dealers have looked askance at the electric washing machine business. Being perhaps more familiar with wiring and construction work, they have been more attracted by that particular phase of the business and have been disposed to allow the merchandising of certain appliances to drift into other channels. The reasons for this procedure are many and varied; the net results are distressing from the point of view of electrical retailing.

A close analysis of the problem seems to present seven distinct features that must be considered by every dealer; in the order of their importance they are:

1. Is the market at hand?
2. What will be the effect on overhead?
3. Is the organization equipped to sell properly?
4. Does the line belong in the dealer's business?
5. Are the discounts sufficient?
6. Can the dealer afford to advertise?
7. Can the dealer finance time sales?

During the year 1923 approximately 565,000 electric washing machines were sold in the United States. It therefore seems difficult to conceive of a section of the country served electrically in which the demand for electric washers would not be present. Women are constantly realizing in increasing numbers and with growing force and effect the labor saving and the time saving made possible by the use of electricity in the home and particularly the value of those devices that reduce the more laborious tasks to mere mechanical processes. For that reason alone it seems that nearly every home not already equipped with an electric washer offers a sales prospect. Washing machines have been seen in use on the porch of huts occupied by the families of section hands; no home is too humble for the possession of such a device.

Hardware stores, department stores and general merchandise stores have for years carried washing machines. In the days before the electric washer these stores sold the old style hand operated machines and readily took on electrically operated washers when they

were first introduced. They have continued to sell electric machines in growing volume, despite the fact that the sales forces of these dealers have generally been lacking in mechanical and technical knowledge. These dealers being usually old established firms, well acquainted with the demands of their trade, it is certain that they would not carry a line that was not subject to ready turnover.

The extensive national advertising that has been done during the past few years by manufacturers of electric washers has instilled in the mind of every woman the desire to be free from the drudgery of housekeeping and particularly to be free from the arduous task of washing. The modern housewife recognizes in the electric washer a device that will make her housework easier. The answer to the first question is, therefore, that the market is almost always at hand.

It is true that all increases in volume of business have their effect on a dealer's overhead expense. However, if this overhead is properly controlled, the addition of a single line, and particularly of electric washing machines, need not increase this expense beyond the point warranted. An analysis of the situation will show that, ordinarily, a dealer's business is self-supporting without the addition of this line. The sales and office organization is generally of sufficient size to handle increased volume without increase in personnel and the average dealer is ordinarily forced to maintain a delivery service. The addition of a line of washers, therefore, means no particular increase in these departments and consequently is not responsible for increase in overhead. On the contrary, the addition of this line often makes possible the use of otherwise unproductive time. Salesmen on such a line are usually engaged on a commission basis and consequently add nothing to overhead expense. Everything considered, therefore, the addition of a line of electric washing machines not only should not increase a dealer's overhead but may actually tend to decrease its percentage in relation to gross volume.

It is unfortunate, but nevertheless true, that many dealers have not developed organizations that are properly equipped to handle sales work. The reasons for this are varied, beginning with the fact that many dealers were originally contractors and that their greatest familiarity, therefore, is with that phase of their business. In the press of estimating and supervision they have not paid the close attention to sales work that must be devoted to the proper growth of a merchandising department. It is almost beyond reason to expect that a dealer's sales organization can be strong if he himself is not closely allied with sales work. However, there are many instances where the merchandising department is under the supervision of someone who is specially trained in the retailing of electrical appliances. Where this is the

case the record of growth has nearly always been consistent and the merchandising department has contributed liberally to the general profits of the business.

The fact that a dealer's staff is not composed of merchandising specialists is no necessary drawback to the successful selling of electric washers. Manufacturers, distributors and jobbers of these appliances are constantly issuing descriptive bulletins, letters, and other forms of informative material that will, if carefully studied, give the dealer's force sufficient information to sell the equipment honestly and satisfactorily. Sales meetings held regularly by the dealer's staff and addressed by representatives of manufacturers' organizations are of inestimable help in developing the selling ability of the force and in bringing to their attention all of the salient facts of the various devices. A dealer who avails himself of all the sales assistance offered and who sees to it that his force also makes use of this aid will rapidly develop an organization that will produce a sales volume and a merchandise turnover, if his buying is properly done, that will show him attractive returns for the effort expended. The mere statement that a dealer's organization is not essentially one of salesmen is, therefore, not sufficient excuse for not handling electric washers.

Electrical appliances were found, originally, only in electric stores. The drift from this channel to that of non-electrical outlets has been occasioned by many things, not the least of which has been the indifference of the electrical dealer himself. There seems to be no reasoning process by which it could be deduced that electric washers do not belong in an electric store. They deliver a service electrically and consequently are an integral and legitimate part of the stock of every electrical dealer.

The question of margin, or discount, has occasioned almost endless discussion. The profit on all makes of washers is usually consistent with their rate of turnover. It is generally found that the device with the long discount is relatively unknown to the consumer and that the discount is given in return for promotion work not done by the manufacturer. Successful dealers in electric washers have usually built their success on the foundation of the product of a reputable manufacturer and have thereby increased their turnover and their net profit. The dealer must decide for himself whether he wants to handle a machine well advertised, made by a reliable company and backed by the standard of that factory's name, or whether he wants to sell a relatively unknown device and to sacrifice at least a part of the differential in discount in the promotion work he will be obliged to do. Generally speaking, a line on which the initial investment is relatively small, that carries a discount sufficient to pay a reasonable sales commission, and that is made by a firm of reliable reputation, will show the dealer that he has made no mistake in decision.

No dealer in business today can afford not to advertise. His location may be the best in town, he may have the most attractive store, the greatest stocks and the best sales force, but if he does not tell the people about his store he will suffer in volume and his overhead will

continue. The amount to be devoted to this purpose must be decided by each dealer and will probably vary with the location, the line to be advertised, the time of year and the dealer's financial status. He should, however, do as much advertising as he can justify.

The financing of time sales at one time was a serious problem for the average dealer. As more attractive term payments were offered the volume of sales grew and the amount of money tied up in non-liquid assets increased. This has all been done away with. The volume of time sales is now larger than it ever was but the dealer is in a better position to handle this class of business. This has come about through the various finance companies that make a business of buying, or handling, retail sales paper. Many of the larger manufacturers have established companies for the purpose of carrying the paper on dealers' sales of their apparatus. Inasmuch as the dealer gets his money as he would on a note at the bank, he is immediately in position to put that money to work again, thereby increasing his turnover. This has been a boon

to the dealer and has served to make more attractive the merchandising of such devices as electric washers.

Giving due consideration to all of the points above mentioned, there seems no legitimate reason why the electrical dealer under normal conditions should not handle electric washing machines and the various other electric labor-saving devices. It seems only logical to expect that the public will look to the electrical store for electrical devices. If not found there the public will automatically be driven to non-electrical stores and the entire tide of electric appliance merchandising may be diverted from its original and logical channel.

Ira R. Seltzer, for seven years president and general manager of the Gordon Electric Manufacturing Company, Waterville, Conn., has resigned to locate in Los Angeles, Calif., where he will represent the company. Mr. Seltzer will also distribute the lines of other manufacturers of electrical and radio materials, carrying stock sufficient to meet the demands of his trade.

Accounting Problem Questions Answered by Expert

The Journal of Electricity has made arrangements with F. V. Mitchell, public accountant of San Francisco, to answer, in these columns, such questions as may be asked on accounting. All readers are invited to forward their inquiries to The Editors, Journal of Electricity. The answers will be published as soon as possible following the receipt of the inquiry.

Question:

What percentage of the total yearly sales, consistent with good business practice, should be outstanding in accounts receivable?

Answer:

There should not at any time be more than 10 per cent of the amount of yearly sales outstanding in accounts receivable. This is absolutely a maximum percentage as it provides for the total current month's sales—1/12 of 100 per cent or 8-1/3 per cent—leaving 1-2/3 per cent of yearly sales in past due accounts.

State Contractors and Dealers Meeting Announced

Pleasure and Business Will Be Combined on Trip to Pit River
Plant of Pacific Gas and Electric Company

The regular meeting of the California State Association of Electrical Contractors and Dealers will be held at Pit River Plant No. 1 of the Pacific Gas and Electric Company on June 28, 1924. Walter F. Price, executive secretary of the association, has made arrangements with the Southern Pacific Company for special accommodations and the entire party will travel in private cars. Those members who plan to leave from San Francisco will take the 9:20 p.m. Southern Pacific ferry on Friday evening, June 27, to Oakland Mole where they will board train No. 16. By special arrangement the private cars of the party will be attached to the end of the train. A special midnight lunch will be served, with hot coffee. The train is due at Sacramento at 1:40 a.m., June 28, and members from the Sacramento Valley may join the party at that point.

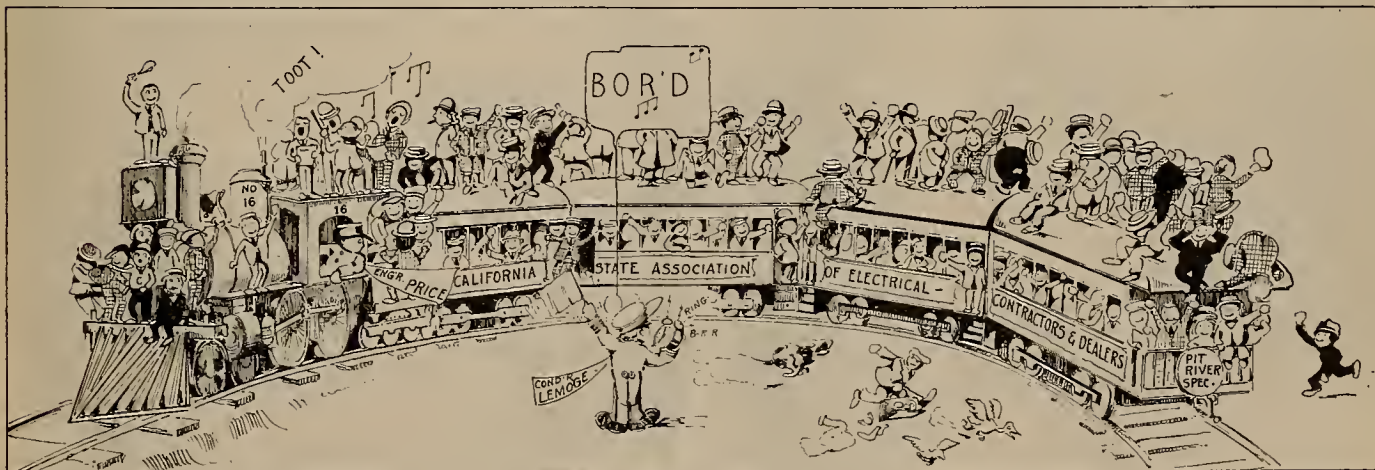
Arrival at Redding will be at 8:48 a.m., June 28, and the party will be ready to proceed immediately, breakfast being served on the train for those who

so desire. Through the courtesy of R. E. Fisher, vice-president in charge of public relations and sales of the Pacific Gas and Electric Company, and through the courtesy of other officials of that company, the entire party will be the guests of Pacific Service from the time of arrival at Redding until the return to that point. Special arrangements have been made for transporting the guests by automobile from Redding to the Pit River plant where all will be quartered at the company hotel. Arrival at the Pit plant will be about 1 p.m. on June 28 and lunch will be served on arrival.

The business meeting will be held at Pit on Saturday evening, June 28. The following morning will be devoted to inspection of the plant, fishing and other sports. The party will leave by automobile for Redding on Sunday afternoon and will return to San Francisco on train No. 13, arriving at the ferry building at 8:10 a.m. Monday morning, June 30.

Well Known Fixture House Joins Electrical Associations

One of the firms which recently became a member of the Electrical Contractors' and Dealers' Association and the Lighting Fixture Dealers' Association, both of Sacramento, Calif., and also of the California State Association of Electrical Contractors and Dealers, is the Thomas Day Company. The company, which designs, manufactures and installs lighting fixtures, is one of the oldest fixture houses in the United States, having been organized in 1840. Its main factory is situated in San Francisco, Calif., with branches in Oakland and Los Angeles, Calif., Salt Lake City, Utah, and Seattle, Wash., in addition to the Sacramento branch at 1014-28th Street, which was opened in May, 1922. Two outstanding installations made by them in Sacramento are the Bank of Italy and the Masonic Temple. Fred LaPlace is resident manager for the company. He is an expert with a scientific knowledge of lighting.



The California State Association of Electrical Contractors and Dealers en route to the Pit River Plant of the Pacific Gas and Electric Company. Business, pleasure, eating and fishing are special features of the trip. Conductor Lemoge and Engineer Price are responsible for the attractive arrangements that have been made for the comfort of the party.

JOBBER, DEALER AND SALES AGENT



Making the Fixture Display Room More Efficient Portland Contractor-Dealer Installs Novel Control Switches as Aid to Lighting Fixture Salesmen

The amount of business that the customer transacts with the dealer depends to a large extent upon the impression that the salesman makes. Likewise the impression that the salesman makes on the customer is affected to a great extent by his knowledge of his stock. Thus it is to the advantage of the dealer to see that his representatives that meet the public are prepared to answer any and all questions in relation to the merchandise they have to offer.

Knowledge of the stock of the electrical concern is particularly needed by the salesman working inside of the establishment. Outside salesmen supplied with samples, catalogs and price books have in most cases become acquainted with the line handled before going out to sell. It is the new inside salesman that the store manager must educate.

The electrical dealer handling fixtures has found that this class of trade is particularly anxious to have someone conversant with the various types ready to meet the customer. The prospect expects to make quite an expenditure and feels that a certain amount of deference should be shown to him. If a salesman, not particularly well acquainted with the fixture line of the company, is permitted to grope around the various fixtures and show that he is not familiar with the type or price of the unit, the prospective customer is likely to become disgusted and either leave the store or demand that the head of the firm be called to show the fixtures.

In either case the concern loses money because the manager cannot afford to leave his other business every time a fixture customer enters the store. Also, if the firm carries a large line of fixtures it is probable that the manager is not in a position to know the prices of the entire line. The result is that the customer feels that there is no one that is well acquainted with the company's line of fixtures.

To overcome any tendency such as this, E. L. Knight of E. L. Knight & Company, Portland, Ore., has so arranged the company's fixture display that the most inexperienced salesman can give the customer absolute satisfaction. In addition to placing the salesman in a position to accurately serve and answer the questions of his customers, the system installed by E. L. Knight & Company has expedited the handling of lighting fixture customers.

All of the fixtures handled by the Portland contractor-dealer are hung in

the rear of the company's store. Comfortable chairs are provided for customers and rugs have been placed on the floor to make the display room more attractive to the eye. Fixtures are hung from the ceiling and from the side walls in the same manner that they will be in the prospect's home and each fixture is wired to a separate wall switch.

These switches have been grouped in gangs of five, the plates being placed on the pillars supporting the colonnades of the ceiling. Brushed brass plates, which have been made considerably wider than the regular five-gang plates, have been used by the Knight company. These plates have been stamped out on the right side so that small cards can be inserted opposite the control buttons on the switches. Each card carries the name of the fixture, type and location for which it is suited and the price of the unit. The switches are so arranged that the salesman has only to look at the panel and he can tell immediately which switch controls any particular fixture that the customer desires to have illuminated.

The entire wiring layout for the store was designed by Mr. Knight and the plan of hanging the fixtures in banks was accepted before any of the wiring was installed. In this way switches for a certain bank of lights are mounted

in each pillar and the control of the lights is greatly facilitated. As each fixture is controlled by a separate switch it is not necessary for the customer to attempt to visualize how the particular fixture would appear if it were the only one illuminated. If, however, the client desires to see how a center fixture blends with various bracket fixtures, it is only necessary for the salesman to switch these on from other pillars.

By using this system of switches, equipped with the indicating cards, any salesman of the company can be pressed into service as a skilled fixture salesman. As the salesman can readily secure the information concerning any fixture directly from the card at the right of the switch, he can show a number of fixtures to a prospect in a minimum of time, thus reducing the amount of time that has to be taken by both customer and salesman.

The cards that are attached to the switches have also been found to assist the company in keeping its display in attractive shape. As all of the necessary information regarding the fixture is contained on the card it is not necessary to attach unsightly price cards directly to the fixture. These pillars have been so located that they tend to make rooms of the various parts of the store but do this without shutting the different sections off from the main show room. Thus the impression of roominess is maintained and the semi-privacy of the departments is also secured.



Fixture display department of E. L. Knight & Company, Portland, Ore.

They Tried It and Succeeded — You Can Do It Too

St. Louis Electrical Dealers Turn Local Street Car System into Sales Producing Medium for New Washing Machine

In every city or town there is some distinctive characteristic that can be capitalized upon by the merchant anxious to stimulate business. The discovery of the characteristic that can be put to use by the dealer is the first and most difficult problem that must be solved. Ingenuity and imagination are necessary as these things are present in all progressive sales work.

By turning the commonplace activities of his city into channels that can be of commercial benefit to his business, many a merchant has added appreciably to his annual sales total. Careful planning and equally careful execution of the plans have been largely responsible for the success of the projects.

In other cases it has been necessary for the dealer, who desires to employ some new sales producing idea, to import an activity from some other town in order that the novel stunt might be put before the public. The results, however, have in most cases been the same, whether the merchant turns some local activity to his service, or goes to some outside territory to secure the plan for his campaign.

A sales producing campaign which could be easily adapted to any city in which there is a street car system, or where motor trucks could take the place of the street car, was recently conducted by two electrical dealers of St. Louis, Mo. These dealers agreed to cooperate in announcing the arrival, in St. Louis, of the new Western Electric washer.

The men in charge of the two electrical establishments knew that whenever any celebrity visited St. Louis, the guest was met by a citizens' committee and escorted around the city in a handsomely equipped parlor street car. These cars are well known by the people of that city and the citizens have naturally connected them with the special occasions on which they have been used. The cars are fitted with luxurious chairs, handsome hangings and thick rugs on the floor. As a result it has been the desire of many residents of St. Louis to have an opportunity to ride in one of the cars.

That the parlor cars of St. Louis could be turned to the use of Frank

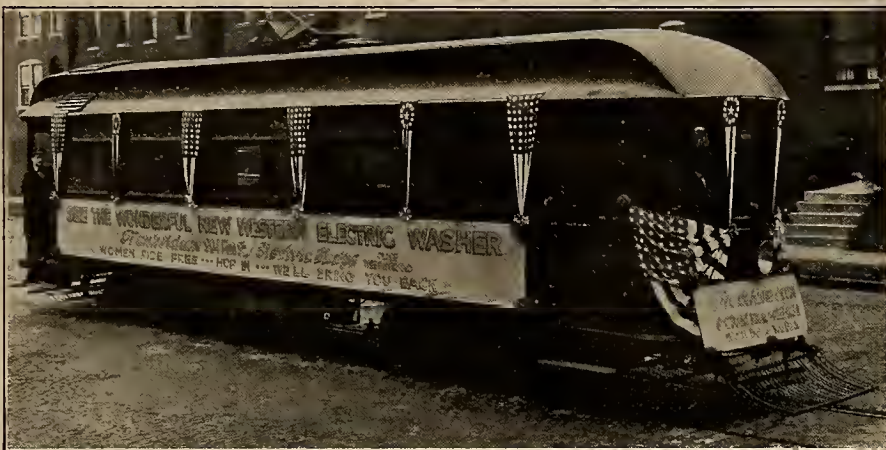
Adam and The Electric Shops, Inc., was agreed upon by the managers of the two electrical establishments and preparations were made to secure the use of the parlor cars to herald the arrival of the new washing machine. Arrangements were made with the street car company to furnish the cars which were to be routed around the city.

Prior to the arrival of the new washing machines, teaser advertisements were run in the daily papers asking "What's Coming?—In Special Parlor Cars—Next Week." No mention was made as to what was to be presented in the parlor cars until the day that the cars, decorated with bunting and

To give the visitors an idea as to just how the washer actually operated a real washing was done on each car.

Window displays and advertisements were used to tie in with the demonstrator "stunt." Exceptional care was taken by both Frank Adam and The Electric Shops, Inc., in preparing feature windows for the campaign and excellent results were achieved. Folders, posters and other forms of publicity were also used to attract attention to the fact that the Western Electric washer had arrived in St. Louis.

Direct and indirect results were reported by the two dealers following the announcement of the new washer. Sales were closed during the period that the cars were used and a long list of prospects was secured by having each woman that boarded the cars register her name and address.

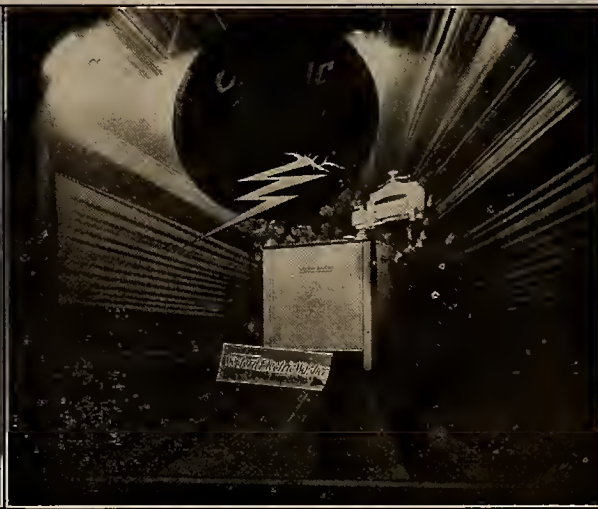


Women were invited to ride free on the parlor cars that carried the new washer. When they entered they were invited to register their names and addresses.

carrying banners announcing the arrival of the new washer, appeared upon the streets. Women were invited to ride on the cars free and it was announced that the car would return the passengers to the spot from which they started. The cars were definitely routed around the town in loops so that the women visitors might be returned to their homes.

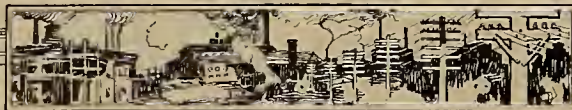
Each car was so equipped that the demonstrators could easily display the outstanding features of the clothes washer to all who came aboard the car.

The mobilized demonstration presented by the St. Louis dealers brought forward an idea that nearly any dealer could put to use in his own town. The parlor car, recognized as an asset in the campaign, is not the only thing that could have been used. Other dealers have put displays upon motor trucks and have toured their cities with these and there is no reason why actual demonstrations could not be made on a motor truck as well as on the parlor car. Visitors could be invited to ride on either vehicle.



The Frank Adam Electric Company and The Electric Shops, Inc., prepared feature window displays to tie in with the parlor car demonstrations.

INDUSTRIAL NEWS



Puget Sound Utility Pays Street Railway Tax Under Protest

To prevent the sale of over two million dollars' worth of its property, seized on May 23 to force payment of 1919 street railway taxes, the Puget Sound Power & Light Company, Seattle, Wash., on June 7 paid, under protest, a total of \$655,294.20 to W. W. Shields, treasurer of King County. The amount paid by the Puget Sound company includes the 1919 tax together with interest at 15 per cent since March 15, 1920.

In making the payment the company stated that the protest was made pending the final outcome of the company's fight against the City of Seattle to force the city to pay three-fourths of the tax, as the city agreed to do in the original purchase contract. By paying the taxes and accrued interest the Puget Sound Power & Light Company has brought to an end the fight between it and King County officials.

Prior to paying the tax the Puget Sound company and the Old Colony Trust Company, a large holder of the former company's bonds, applied to the Federal Court in Seattle for temporary injunctions restraining the King County sheriff from selling the power company's holding to satisfy the 1919 tax. Three judges took the matter under advisement on June 2 after hearing the details of the purchase by the city of the street railway system and the court proceedings subsequent to the purchase. On June 5 the judges handed down a decision holding that the tax was due and delinquent and that under the state law the county officials were required to distrain personal property to secure payment. The court dismissed the application of the two corporations stating that it had no jurisdiction in the case of the Old Colony Trust Company and that the Puget Sound Power & Light Company has an adequate remedy at law.

Temporary Rate Increase Asked by Edison Company

The Southern California Edison Company has filed an application with the California Railroad Commission for authority to file and make effective from July 1, 1924, to March 31, 1925, inclusive, new rate schedules providing emergency increases over the present rates. The proposed rates would produce approximately \$3,000,000 more revenue for the given period, than the present rates.

The application is necessitated, the company claims, by the present deficiency of the water supply available to its hydroelectric plants during the current year of 1924, which is, and will be,

the lowest of which any accurate record exists, with the result that the company's production expenses will be approximately \$5,568,000 greater than they would be if 1924 were an average water year. According to the application the company, due to shortage of water, will be required to operate its steam generated electric plants, incurring the purchase of large quantities of fuel oil, and will also be required to purchase large amounts of electric energy to supplement its available supply.

The company sets forth also that the deficiency in the contingency reserve at the end of 1924 will be approximately \$4,045,000, which deficiency will leave the company far short of a fair return for the year 1924, and is too great, it is alleged, to be overcome by possible credits to contingency reserve in the years immediately following 1924.

California Power Situation Is Subject of Meeting

To consider the question of the institution by the California Railroad Commission of an investigation into the operation of electric utilities in the state during the present emergency resulting from abnormally low precipitation a public hearing was scheduled for June 13. Notice of the hearing was forwarded to eight power companies in southern California and to nine cities operating municipal plants.

The question as to whether there will be an actual shortage is still somewhat doubtful, although present indications are that some shortage can hardly be avoided. Unless fall rains are later and lighter than usual the amount of this shortage will not exceed a few per cent for the remainder of the year. The purpose of the commission's investigation is to enable it to require the most efficient distribution of the power available and to require that any curtailment that may be necessary be spread as fairly as possible.

Telephone Company Entertains Rocky Mountain Electrical League.—Members of the Rocky Mountain Electrical Co-operative League of Salt Lake City, Utah, were guests of the Mountain States Telephone & Telegraph Company at its Wasatch Exchange in Salt Lake City on the evening of May 15. A large number of electrical people were present. The visitors were shown through the building by officials of the telephone company who acted as guides, and various demonstrations were given showing the use of the telephone apparatus and equipment, one of particular interest being that showing the operation of the switchboard. The Mountain States Telephone & Telegraph Company has recently become a member of the League.

Discuss Bone and Erickson Bills at Spokane Meeting

Arguments in favor of Bone and Erickson power bills were refuted at the June 2 meeting of the Associated Industries of Spokane, Wash., by John B. Fiskien, consulting engineer of The Washington Water Power Company. The arguments in favor of the bills were presented to the association on the previous week by George Nixon of the Nixon-Kimmel Company, electrical contractor-dealer of that city. Mr. Nixon has been the leading proponent of this legislation in Spokane.

Mr. Fiskien called attention to the vicious elements of the proposed bills, emphasizing particularly the fact that the operation of municipal plants does not bring about general rate reductions, and also exploding the idea that cost of power is the controlling element in the location of large new industries. Mr. Fiskien's experience of over thirty years in The Washington Water Power Company, and his many activities in association work have qualified him in an exceptional manner to discuss the broad questions of private vs. public ownership of utilities. His discussion of the Bone and Erickson bills was well received by the Associated Industries.

Lester N. Livengood of the Taxpayers' Economy League supplemented Mr. Fiskien's statements with an exposition of the effect upon taxpayers of the removal of the tremendous investment of the present public utilities from the general taxrolls.

Manufacturer Publishes History.—

The Westinghouse Electric & Manufacturing Company has recently published an attractive twenty-four page book entitled "Forty Years Ago." The book presents a brief account of the history and accomplishments of the Westinghouse Company since its entrance into the electrical industry on May 20, 1884, when George Westinghouse and H. H. Westinghouse, his brother, engaged William Stanley, the young engineer who had invented a self-regulating dynamo for lighting service. The illustrations in the publication show the evolution of many of the present day electrical devices.

Alaska Permit Sought.—John Hovaland of Hyder, Alaska, has applied to the Federal Power Commission for a preliminary permit covering a project on Fish Creek. An active mining district recently has developed in the vicinity of Hyder and the power is intended for use in connection with mining operations. This is the third power project to come before the commission from the Hyder area. In the two other cases, preliminary permits already have been issued.

License Is Issued to Columbia Valley Power Company

The Federal Power Commission has authorized the issuance of a license to the Columbia Valley Power Company covering two proposed developments in the Deschutes River in central Oregon. Various conditions, however, are attached to the license. A preliminary permit covering the two sites was issued to this company on Feb. 6, 1923.

The license covers the construction at the Pelton site of a masonry dam 185 ft. high at which 51,000 hp. will be developed. The company furnished satisfactory plans for the proposed structure. At the Metolius site, the other one involved, which is eight miles above Pelton, it is proposed to construct a dam 330 ft. high. The detailed plans for this development have not been worked out but the applicant proposes to prepare them during the construction of the Pelton development.

The Columbia Valley company sets forth in its application that a portion of the power it will develop probably will be sold to the two public utility companies operating in Portland. It is stated that within five years these utilities will have to have 40,000 hp. additional. Power can be developed, it is stated, on the Deschutes River cheaper than at sites controlled by the utility companies on the Clackamas River in Oregon and on the Lewis River in Washington. The company also advises the Federal Power Commission that other markets for power have been investigated and the opinion is expressed that the full output of the Pelton plant can be utilized on its completion and that the construction work will have to go ahead immediately on the Metolius plant.

The chief engineer of the power commission in recommending a license said that the company had shown such diligence in carrying out the provisions of its preliminary permit, and in investigating the market for its power that the license sought should be granted promptly. The conditions of the licenses are: plans for the Metolius development and transmission lines are to be submitted whenever called for; logways are to be installed when requested to do so by the Secretary of the Interior; the right to use water for power purposes is to be subordinate to the requirements for irrigation in the upper valley. There was a further minor condition with regard to furnishing power at certain rates to the Warm Springs Indian Agency.

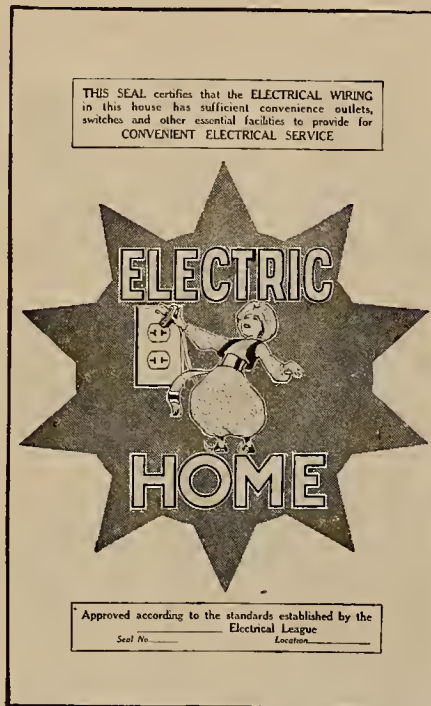
Red Seal Campaign Is Announced by National Society

In an effort to see that every home is adequately wired, The Society for Electrical Development displayed for the first time, at the last annual convention of the National Electric Light Association, what is to be known as the Red Seal plan. The Red Seal campaign is projected for a national campaign and is designed to be used in communities where electric homes have been exhibited to the public.

The plan calls for the placing of the Red Seal poster on any home that, according to the wording on the poster, "has sufficient convenience outlets, switches and other essential facilities

to provide for Convenient Electrical Service." The poster is to be awarded by the local electrical organization. The Red Seal is essentially the same as the one initiated and used by the Electric Service League of Toronto, the rights to the plan having been acquired by The Society for Electrical Development.

According to the new owner of the copyrighted seal, the plan calls for "a cooperative local advertising and selling campaign, to acquaint the public with the Red Seal, also specialized advertising directed to architects, building con-



Miniature reproduction of Red Seal poster. The original poster is printed in red and black with the seal appearing in red.

tractors, real estate men, home owners and others to explain the advantages of adequate wiring and the meaning of Red Seal approval."

The posters will be supplied to the local electrical associations and are to be imprinted with the name of the league approving the installation. The material that The Society for Electrical Development will furnish, at nominal charge, includes: a manual on how to organize the campaign; Red Seal signs, for the outside of the house; Red Seal labels, for permanently attaching to the meter box; Red Seal certificates, documentary evidence to be used by builder or owner when offering house for sale; Red Seal advertisements; Red Seal form letters; Red Seal window trims; Red Seal poster stamps and other supplementary publicity.

Misstatement in June 1 Issue Corrected.—An obvious error in the preliminary announcement of the program of the World Power Conference as issued by the American Committee was copied in the June 1 issue of the Journal of Electricity. The program credited W. A. Doble as being chief engineer of the Pelton Water Wheel Company. Mr. Doble is in no way connected with that concern but carries on a consulting practice in San Francisco.

California Oregon Starts Work on Copco No. 2 Plant

Construction work on the new Copco No. 2 hydroelectric plant of The California Oregon Power Company on the Klamath River in northern California has been started and it is expected to have the plant completed and in operation by April, 1925. The plant will be practically a duplicate of Copco No. 1 and will contain two vertical hydraulic turbines operating under a head of 166 ft., each driving a 15,000-kva. generator. The development will consist of a power house, small concrete diversion dam and combination tunnel and flow line. The diversion dam will be located about 1,000 ft. downstream from the present plant and the new plant in turn about a mile farther down the river.

A 110,000-volt transmission line 82 miles in length will be built from the plant to Delta, Calif., where it will connect with a line of the same voltage to be built by the Pacific Gas and Electric Company to carry the power to Cottonwood, a distance of 43 miles more. Wooden pole structures spaced about 600 ft. apart will be used in the line which will be a single circuit transmission line with 250,000-cir. mil conductors having a capacity of 40,000 kw.

The California Railroad Commission has approved a 25-year agreement under which the entire output of the plant will be sold to the Pacific Gas and Electric Company. The contract specifies the delivery of 20,000 kw. with a monthly load factor of 70 per cent.

Members Sought by Society for Electrical Development

A broadside, designed to inform prospective members of The Society for Electrical Development of the advantages of membership in the organization, has recently been sent out to a selected list of companies that are not members. The broadside tells of the advantages of increasing the demand for electrical devices by means of co-operative advertising and shows how each branch of the industry gains from the work of the society.

The service given by the society in 1923 is reviewed and there is also a brief description of the material that is provided for use of members of the organization. A blank, permitting companies to subscribe to membership or to make either a general subscription or commodity subscription, is part of the broadside.

San Francisco Public Utility Commission Recommended.—A charter amendment providing for the creation of a Public Utility Commission to direct the operation of all properties owned by the City of San Francisco engaged in "furnishing water, light, heat, power, transportation, communication and other service of a public utility character" was introduced to the San Francisco Board of Supervisors on June 2 by Ralph McLeran, chairman of the finance committee of the board. An amendment of similar character was rejected by San Francisco voters at the last general election. The proposed legislation provides for the appointment by the mayor of a board of five public utility directors who shall be approved by the Board of Supervisors.

Plans for Pacific Coast A.I.E.E. Convention Announced

Tentative plans for the annual Pacific Coast convention of the American Institute of Electrical Engineers to be held at Pasadena, Calif., Oct. 13-20, 1924, were made at a recent meeting of the convention committee of that body. The preliminary draft of the program is as follows: Monday morning, registration and opening ceremonies; afternoon, transmission papers, F. G. Baum, presiding; Tuesday morning, distribution papers, C. A. Heinze, presiding; afternoon, utilization papers, E. E. F. Creighton, presiding; Wednesday morning, papers on generation and machinery, H. M. Hobart, presiding; afternoon, research and electro-physics, Prof. R. W. Sorensen, presiding; evening, an address by Dr. R. A. Millikan; Thursday morning, telephony and telegraphy, A. H. Griswold, presiding; afternoon, golf and recreation, and later in the afternoon the start will be made to Mount Wilson, where the guests will have an opportunity to see the apparatus of the Carnegie Institute in action; Friday morning, automobile trips; afternoon, miscellaneous papers, L. W. W. Morrow, presiding; evening, Edison banquet; Saturday will be devoted to special trips to points of engineering and general interest.

The larger part of the papers to be presented at the sessions will be furnished by the papers committee for the Pacific Coast convention, and the balance will be supplied by the national meeting and papers committee. Fifteen papers have already been secured by the Pacific Coast committee. The convention will be held at the Huntington Hotel at Pasadena. Prof. R. W. Sorensen, of the California Institute of Technology, is general convention chairman, and J. E. MacDonald, of Los Angeles, is chairman of the papers committee.

Utah Company Adding 20,000-kw. Unit to Jordan Plant

Work on the addition to the Utah Power & Light Company's Jordan steam plant, in Salt Lake City, Utah, is progressing rapidly, and it is expected that the enlarged plant will be ready for operation by the end of this year. This project involves the expenditure of approximately \$2,000,000. When completed it will mean the addition of 20,000 kw. to the installed capacity of

this steam-electric generating station. With its present capacity of 15,000 kw. this means that the plant will be capable of producing about 45,000 kw. of electrical energy.

The new unit will be a 20,000-kw. turbo-generator, direct connected and weighing 515,000 lb. The 9-stage Curtis turbine will be fed from a 16-in. steam header from the pressure boiler plant. The exhaust steam from the turbine will be passed through a surface condenser containing 6,088 1-in. tubes. Each tube is 19 ft. long. The combined length of the tubes for the condenser is 115,672 linear ft., or approximately 24½ miles. This unit will condense 230,000 lb. of steam per hour.

The condenser circulating water is pumped from the intake flume by means of two 38-in. pumps pulling 1,900 gal. per minute. Each is driven by a 150-hp. motor. The condensate from the condenser is returned to the boiler feed water system by means of two pumps, each of which will handle 250,000 lb. of condensate per hour. Each pump is driven by a 50-hp. motor.

In addition to this equipment there is a great deal of smaller auxiliary equipment, including an oil filtration system, piping and gages and indicating devices, besides the necessary electrical equipment, including buses, switches and control apparatus.

All of the generating equipment of the old plant is being thoroughly overhauled and necessary replacements made. Underfeed stokers with forced draft have been installed and the capacity of the boilers thus greatly increased. Their ratings have been more than doubled, thus avoiding new boiler installations.

Public Land Owners Cannot Eject Transmission Line Companies.—Patentees of public lands across which power transmission lines have been constructed under authority and regulations of the Secretary of the Interior cannot eject the corporation owning such lines from the land, according to a decision of the United States Supreme Court, in an opinion by Justice Butler. The decision upholds the authority of the Secretary of the Interior to make reservations in granting patents to homestead entries. The case was that of the Washington Water Power Company against John Swendig and others, the decision of the lower courts being affirmed.

New Golf Trophy to Be Awarded at P.C.E.A. Convention

A new golf trophy, to be played for at the annual conventions of the Pacific Coast Electrical Association, has just been donated to the association by The Pelton Water Wheel Company of San Francisco. The trophy is in the form of a cup measuring nearly two feet in height, including an ebony base. It is of simple design, silver plated and pro-

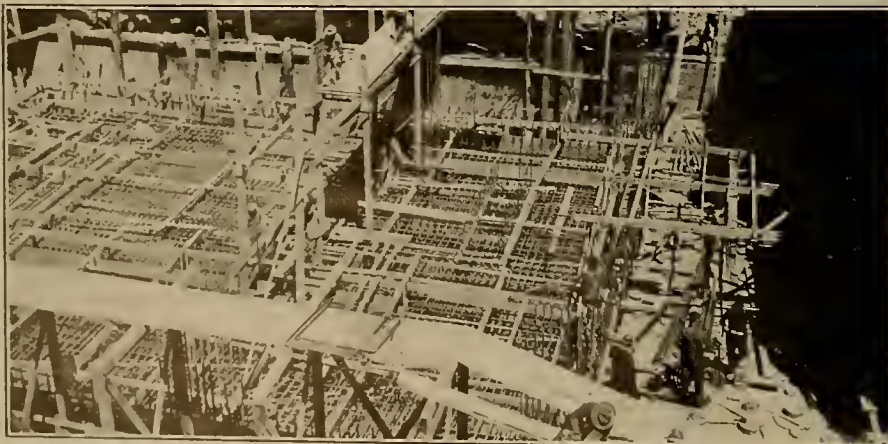


New golf trophy presented to the Pacific Coast Electrical Association by The Pelton Water Wheel Company.

vided with suitable inscription, including place for the winner's name, a three-time win giving permanent possession of the cup.

It has been agreed that the Byllesby cup, which has been the subject of competition for years, will be played for by registered members and guests whose club handicap is 18 or less. Those whose handicap is in excess of 18 will be eligible to win the Pelton cup under the same conditions. The Pelton cup is offered in memory of Lester A. Pelton, inventor of the Pelton water wheel and founder of The Pelton Water Wheel Company.

Trophy Donated to Seattle Electric Club Golfers.—Plans for a golf tournament to be held at Jefferson Park course, Seattle, Wash., under the auspices of the Seattle Electric Club, are being perfected by Harry J. Martin of the National Carbon Company, president of the club, and J. C. Zanker and R. C. Buckles of the Westinghouse Lamp Company. Three prizes will be awarded, the major prize, the president's cup, to be donated by Mr. Martin. Between fifty and sixty men of the electrical fraternity in Seattle, including jobbers, manufacturers' representatives and central station men, are expected to play in the tournament. Date for starting play will be set at an early meeting.



Placing reinforcing steel and conduit for concrete mat for new 20,000-kw. steam unit at Jordan plant of Utah Power & Light Company.

Northwest Telephone Companies Win Point in Rate Case

The Pacific Telephone & Telegraph Company and the Home Telephone Company, according to a recent ruling of the United States Supreme Court, recently won a point in their fight to raise telephone rates in Seattle, Tacoma and Spokane. The Supreme Court ruled, in effect, that the companies have the right to go into the federal courts and sue for an injunction which would restrain the State Department of Public Works from interfering with their rate-raising program, thus reversing Federal District Judge E. E. Cushman.

Judge Cushman held a bill of complaint, in which the companies asked for the injunction, could not be taken into the federal court until the companies had exhausted all legal resources in the state courts. The companies had initiated no action in the state court. Chief Justice Taft's opinion said the lower court had erred in denying the temporary injunction and had ruled improperly that the bill of complaint by the companies was premature, adding that the merits of the issue could be developed in the District Court, to which proceedings were remanded. The companies assert they are losing \$700 to \$3,000 a day, respectively, through the refusal to permit higher rates.

Formulating Plans for Lighting Educational Campaign

Plans are now well forward for the Lighting Educational Campaign, which consists of a national contest among architects for the design of three types of model houses and an essay contest among school children. The purpose of the campaign is to sell the public on the desirability of re-lighting the 12,000,000 homes in this country and Canada, which now enjoy electric service. The necessity for this work is

the campaign most effective, according to The Society for Electrical Development.

The National Electric Light Association, National Council Lighting Fixture Manufacturers, the Lighting Fixture Dealers' Society of America, Association of Electragists, International, The Society for Electrical Development, Electrical Supply Jobbers' Association and other electrical organizations will be delegated certain parts of the work. The National Eyesight Conservation Council, the National Education Association and other organizations outside the electrical industry are keenly interested in the work and have promised their cooperation.

The work will be financed by the lighting equipment manufacturers and fixture interests. Committees will be organized locally under the direction of a territorial supervisor and it is hoped to interest every incorporated city, town and village. A special committee, known as the Lighting Educational Committee, has been set up temporarily to take care of the organization of the campaign. An agency has been appointed to handle the national magazine advertising and The Society for Electrical Development will take care of the publicity through national media and local newspapers.

Canadian Company Proposes Dam for Kootenay Lake Site

The West Kootenay Power & Light Company, Ltd., Rossland, B. C., has made an application to the Canadian Provincial Government water power branch for authority to raise the low-water level of Kootenay Lake 6 ft. and thereby impound 678,500 acre-feet. The plans submitted by the company provide for a dam, situated at Granite, with a movable crest that can be hoisted on piers, whereby the high-water level of the lake will not be affected. The proposed dam would be 1,200 ft. long.

The company has had in operation for some years a 20,000-kw. hydroelectric plant at Upper Bonnington and has under construction a plant of similar capacity at Lower Bonnington. By raising the level of Kootenay Lake 6 ft. the capacity of these plants can be practically doubled.

The need for this increased power is due to the demand made on the company by the Consolidated Mining & Smelting Company of Canada, which on account of the shortage of power at its smelter, at Trail, is shipping zinc concentrate at the rate of 100,000 tons per year to Antwerp for treatment. Large quantities of lead bullion and copper matte are being shipped to Europe for treatment for the same reason. For some time the company has been experimenting on a process for the electric smelting of copper concentrate.

Coffin Medal for 1923 Is Awarded.—The Public Service Company of Northern Illinois was awarded the Charles A. Coffin Medal for 1923 on May 21 at the annual convention of the National Electric Light Association. The winner is credited as having made, during 1923, "the greatest contribution towards increasing the advantages of the use of electric light and power for the convenience and well-being of the public and the benefit of the industry." The award was made to the Southern California Edison Company last year.

Edison Company Checks Output of Distribution Department

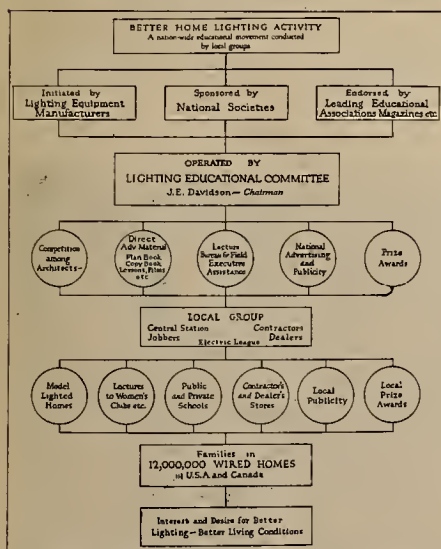
For computing the man-month output or the cost of work per man per month the department of budget and expenditure of the Southern California Edison Company has installed a system that determines the efficiency of the distribution department of that company. The system as adopted by the company is designed only for the distribution department because of the nature of the work of that department, the work being mostly of a routine character.

In showing the efficiency of the men in the distribution department the gang foreman's weekly report is made to cover each gang as a unit. Man-days are shown according to the number of hours worked, based on an 8-hr. day constituting one man-day and 26 man-days constituting a man-month. The field clerk on the gang makes out a report which is turned in each week with the following information: man-days, labor, superintendence, automobile cost, supply, transportation and tool expense. A monthly comparison is made of the following: total cost of work, the number of man-months, man-month output, labor cost, and the per cent of labor to the total cost.

Rules of procedure have been adopted by the company in order to keep all reports on a comparative basis. A few of the rules are as follows: The man-days of a member of a gang, going to work in some other gang, even but for a portion of a day, must be dropped from the gang he leaves. The man-days of a man coming to a gang from another gang must be shown. Where two or more gangs work on the same job the gang which accounts for the material must carry the man-days for that job. The man-days of a man working overtime on trouble separately from his gang must not be shown. The rule in comparing records of the various gangs is that each gang is working against its past record.

According to the May issue of "Edison Facts" the results of the analysis "are gratifying from the viewpoint of comparison. . . . The number of gangs had been increased 20 per cent, which meant the absorption of new life into the organization. Even with this increase it was found possible to make an effective showing through an increase in the man-month output of 8.86 per cent, a decrease in cost of labor of 3.55 per cent, and an increase in the average wage in the field of 2.61 per cent. This record was made last year in the face of rush construction, due to the unusual amount of new business and also to an extensive reconstruction program, necessitated by changes to conform with the new state law."

One Application for California Hydroelectric Development Received.—Only one application of any magnitude for appropriation of water for hydroelectric development was filed during May, 1924, with the Division of Water Rights of the California Department of Public Works. This was presented by the Bear River Water & Power Company, Auburn, Calif., and asked for 250 sec.-ft. and 100,000 acre-feet per annum from Bear River, in Placer and Nevada Counties, to develop 42,994 hp. There were no permits issued during May by the department for water for power development.



Organization chart for Lighting Educational Campaign.

shown by studies which have proved that the average home is less than 50 per cent adequately lighted. While the essay contest, which is to be conducted among school children, will probably not be launched until the fall, there is a tremendous amount of organization work yet to be done in order to make

Commission Fixes New Rates for Idaho Power Company

Valuation of properties and establishing of new rate schedules, including a schedule covering the sale of "surplus power," of the Idaho Power Company have been the subjects of recent orders of the Public Utilities Commission of the State of Idaho.

The commission has fixed new schedules of rates in the following classifications: commercial lighting, high voltage power, medium voltage power, low voltage power and commercial cooking and heating. The new rates provide for a five per cent discount on contracts of not less than five years' duration and ten per cent discount on contracts of not less than ten years' duration. The company is required to render to the commission monthly reports of revenues derived from each schedule for the purpose of furnishing the commission a basis upon which to judge the adequacy of the rates over a period of time. By a recent order of the commission, the company is required to bill all customers receiving service under the above schedules, and in addition, under its municipal incandescent street lighting schedule, for ten months from March 1, 1924, or until further order of the commission, on the basis of the rate applying to ten-year contracts, regardless of whether or not such contract has been made with the customer.

In connection with the fixing of these schedules, the commission has proposed a new rate to be known as an "off peak rate," providing for the utilization of the surplus power of the company as such power is found to exist. The commission has found that during the months of October to April, inclusive, the company has available surplus power at most of its generating plants, and surplus transmission, transformation and distribution capacities at various places. The suggested rate provides for serving loads of not less than 30 hp., based on a 15-minute maximum demand during the month, in return for a payment of \$1 per month per contract hp., entitling the customer to 50 kw-hr. per contract hp., and the payment of 1 cent

per kw-hr. for all excess consumption. The schedule provides for delinquent payment penalties, and a special load factor discount for load factors in excess of 30 per cent.

"Surplus power" is defined as being "such power as can be supplied and delivered without additional investment by the company from equipment already in service and for which there is no demand under other rates in this tariff." The application of the schedule, the point of delivery of the power, the point of measurement of the power, the term of contract and the obligation to furnish service are all defined, and the salient features of these definitions may be summed up by saying that the company must furnish surplus power at this rate only when and where it is available, from the nearest existing circuit; the customer being required to build and maintain his own connection to such circuit.

Seattle Council Asked to Appropriate Funds for Extensions.—J. D. Ross, superintendent of the Seattle (Wash.) municipal light department, has asked the city council to appropriate sums aggregating \$445,000 from the city light fund to take care of new business. Mr. Ross asks \$300,000 to build extensions to supply new customers in the residence districts; \$20,000 to enlarge the street lighting system; \$75,000 for new underground conduits; and \$50,000 to construct extensions to shops and stores in the business section. Mr. Ross also recommended the sale of \$1,000,000 worth of city light bonds, most of the money to be spent for improvements in the city distribution system to take care of Skagit current.

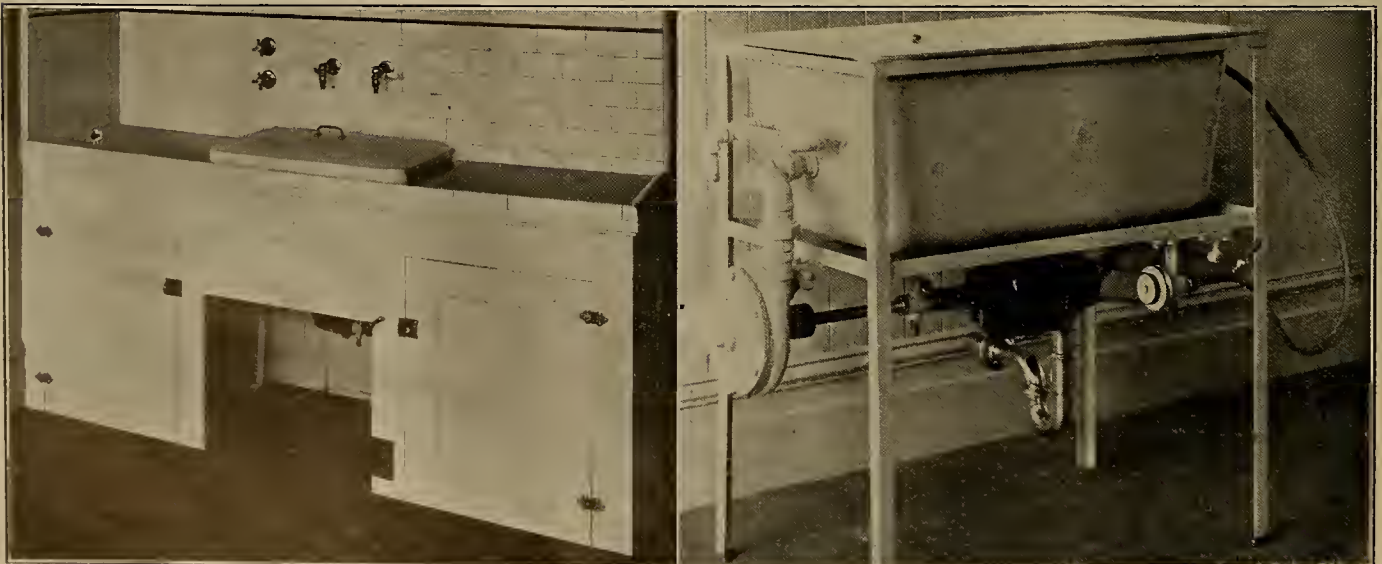
Manufacturer Presents Annual Report.—In the annual report of the Westinghouse Electric & Manufacturing Company issued recently, announcement is made that the company earned 18 per cent on its stock during the last fiscal year. The report states that the net income available for dividends was \$16,125,303. Gross earnings for the year were \$154,412,918.

Illuminating Engineering Society Chapter Is Organized

Nineteen members of the electrical industry of the San Francisco Bay territory who are interested in matters pertaining to better illumination met in San Francisco, Calif., on June 10 and formed the Bay Cities Chapter of the Illuminating Engineering Society. Clark Baker, of the National Mazda Lamp Works of the General Electric Company, Oakland, Calif., acted as temporary chairman pending the election of officers.

James G. Cravath, illumination engineer and president of the Pioneer Electric Company, Richmond, was elected as chairman of the chapter and S. H. Russell, of H. B. Squires Company, San Francisco, was elected vice-chairman. C. A. Russell, Pacific Gas and Electric Company, San Francisco, was elected secretary. A board of managers was also elected and comprises the following: Clark Baker, National Mazda Lamp Works of General Electric Company; H. E. Sandoval, manager of electric sales, Pacific Gas and Electric Company; R. S. Prussia, illumination engineer of the Westinghouse Lamp Company; Romaine W. Myers, engineer, Oakland, and Dr. Percival Dollman, oculist, San Francisco.

Rates Reduced by Pacific Power & Light Company.—A new schedule of rates has been filed with the State Department of Public Works at Olympia, Wash., by the Pacific Power & Light Company, announcing a general reduction in electric light and power rates in the entire territory covered by the company's lines. Operations of the company cover numerous cities and towns and rural communities throughout the Yakima Valley, the Walla Walla district and the White Salmon section. By reason of inability to check stations and get the billings out in time, the company states it was impossible to make the change effective for all points as of May 1. Those coming under the May 1 change were Walla Walla, Pomeroy, Dayton, Waitsburg, Pasco and Kennewick.



New electric dishwashing machine recently put on the market by the Fassio Company of San Francisco. The new machine is a sink and dishwasher combined and is installed as shown in the illustration at the left. General construction of the dishwasher is shown at the right. The new device is equipped with a flexible shaft which may be used to drive a pot scouring brush or either of two types of beaters. The manufacturer also claims that light washings may be done in the sink.

New Officers Are Named by Utah Engineering Societies

The annual meeting of the Utah section of the American Institute of Electrical Engineers was held jointly with the Utah Society of Engineers at Saltair, Salt Lake City's famous resort, on the evening of May 31. About 100 members and their wives were present. A banquet was served with Dr. Joseph F. Merrill, dean of the school of mines of the University of Utah, and former president of the Utah section of the A.I.E.E., as toastmaster.

New officers for the Utah section, A.I.E.E., were elected, as follows: H. W. Clark, city engineer's office; Salt Lake City, chairman; John Salberg, engineer, Westinghouse Electric & Manufacturing Company, Salt Lake City, secretary and treasurer; C. R. Higson, engineer, Utah Power & Light Company; Lester B. Johnson, engineer, General Electric Company, Salt Lake City; W. M. Scott, superintendent, lines and service, Utah Power & Light Company; Leo Brandenburger, manager, Salt Lake City branch of Wagner Electric Corporation; and Paul P. Ashworth, distribution engineer, Utah Power & Light Company, executive committee.

The Utah Society of Engineers elected the following: R. A. Hart, senior drainage engineer, U. S. Bureau of Agriculture, Salt Lake City, president; Ernest Gayford, vice-president and secretary, General Engineering Company, Salt Lake City, first vice-president; James W. Wade, assistant manager, Tintic Standard Mining Company, Salt Lake City, second vice-president; J. A. Hale, engineer, Utah Power & Light Company, secretary; R. K. Brown, chief engineer, Salt Lake & Utah Railroad, treasurer; and H. C. Goodrich, chief engineer, Utah Copper Company, Salt Lake City, was named a member of the executive committee.

Annual Report Announces Growth of Utah Utility Company

The Utah Power & Light Company has published its annual report to stockholders for the year 1923. This report indicates substantial growth of the territory served by the company, and consequent extension of power facilities. There is shown a net gain of 3,541 electric customers during the year, to meet the demands of which the company has installed and placed in operation during the year an additional 11,000-kw. unit at its Grace hydroelectric plant. The report also states that work is under way on the new 14,000-kw. hydroelectric plant at Soda, Idaho, which plant is expected to be completed and in operation during the late summer of this year; and that improvements have been made in the Jordan steam reserve plant in Salt Lake City. The report further states:

"Further increases in power plant capacity must be undertaken without delay, and with this in mind the company has secured from the Federal Power Commission a preliminary permit for the Flaming Gorge site on the Green River in Utah, and, if investigations show the development of that site to be practicable, it intends to seek a federal license covering the construction there of what will be one of the largest dams in the United States and of a generating station from which electric energy can be produced annually equiv-

alent to more than 40 per cent of the total energy produced by the company in 1923."

Another interesting feature of the report is the large growth shown in customer ownership of the company's 7 per cent cumulative preferred stock. The report states: "On Dec. 31, 1923, these customer-owners numbered 3,773, and held stock to the par value of \$4,134,000, in addition to large local holdings of the company's bonds." Since the first of the year to May 1 there has been an increase in sales of stock to customers of \$698,900 par value.

Diversion of Trinity River Is to Be Investigated

A thorough investigation is to be made of the proposed diversion of the Trinity River into Sacramento Valley in California. This project is covered by an application for a combined irrigation and power project made to the Federal Power Commission by W. H. Sampson, of Corning, Calif. The California board, appointed by the commission to investigate the project, reported in favor of the diversion. Further investigation on the part of the commission, however, indicates that the power alone cannot bear the cost of the project. There is doubt as to the ability of the lands which will be improved to bear enough of the cost to make the development profitable to all concerned.

Before taking final action, the commission is sending Major H. B. Bennion, its assistant chief engineer, to California to look over the project and has requested the Secretary of Agriculture to report as to the price the farm land would be justified in paying for the water.

The commission has just been advised by Mr. Sampson that the cities on the eastern side of San Francisco Bay are considering going to the Trinity for their water supply. The commission is anxious to establish whether or not this project is in a position to compete with San Francisco, which would like to furnish water to its neighbors from its Hetch Hetchy project, and with the Snow Mountain Water & Power Company, which is in a position to furnish the necessary water from Eel River.

Chinese June Wedding Held at Los Angeles Electric Club Meeting.—To open June Bride Week in Los Angeles, Calif., a mock Chinese June wedding was conducted at the June 2 meeting of the Electric Club of that city. Electrical gifts were purchased for the "Bride" and after all preparations had been made the "Bride" was married according to ancient Chinese custom. Miss Helen Mikesell, secretary of the Electrical Contractors' and Dealers' Association, acted the part of the Chinese June Bride and R. H. Manahan impersonated the father and later the Chinese minister. Other participants in the affair were: Miss Vere Crockwell, Roy Lockhart, E. P. Markee, Alfred Bachrach, B. G. Hatch, Howard S. Warren, R. C. Herb, E. B. Read, W. J. Sullivan, W. F. Wilson, R. E. Carter, F. B. Nightingale, who acted as chairman of the day, and little Misses Dodd and Shinn.

The South End Electric Company has moved from 1632 West 58th Street to 5501 Moneta Avenue in Los Angeles, Calif.

Books and Bulletins

PRINCIPLES OF ELECTRIC MOTORS AND CONTROL

By GORDON FOX. 499 pages, 298 illustrations. Cloth, 5 $\frac{1}{4}$ x 8 $\frac{1}{4}$ in. \$3.50. Published by McGraw-Hill Book Company, Inc., New York, N. Y.

Many books have been published on the subject of electric motors, but few treat the subject from the standpoint of the application and operation of motors. Most texts treat the subject from the standpoint of the designer, but as the author points out, "a much larger class is interested in its application and operation than in its manufacture." A text which will assist in the selection of this universally used piece of electrical equipment, covering as it does the principles, performance, characteristics, and practical construction, should be of great value to the industry. The treatment is simple and of a practical character throughout, keeping in mind the needs of the man who must operate motors. Vector diagrams and higher mathematics are not used and theoretical types of motors have been mentioned only where they would have a bearing on practical designs. From the standpoint of the student this book should be of value as supplementary reading in an electrical engineering course.

The direct current motor with the various schemes of speed control as well as factors entering in the operation of this type of motor, such as armature reaction, is treated in the first four chapters of the book. The polyphase induction motor with its method of speed control; the polyphase synchronous motor; the single-phase motor, and the brush-shifting polyphase commutator motor are next treated.

Electric motor construction features covers one chapter, after which the principles of direct control and later the principles of alternating current control are treated.

Several chapters are then devoted to miscellaneous features of electric motors and control, such as the alternating current magnetic controller, the operation of motors in parallel and series, and electric motor braking.

Throughout the book the explanations are clear and the drawings and diagrams are plentiful. The most up-to-date equipment is described, and many good photographs are used. The author has collected information on this very useful piece of electrical machinery which should be of value, not only to students and engineers, but to anyone who is interested in the selection and the application of electric motors and controllers.

One very valuable feature of the book is a somewhat complete bibliography at the end of each of the chapters throughout the book.

E. R. S.

Chandeysson Electric Company, St. Louis, Mo., has recently issued five bulletins relating to the Chandeysson line of motors and motor-generator sets. The bulletins are replete with illustrations and descriptive matters.

Meetings

Announce Program for Northwest Association Convention

The program for the seventeenth annual convention of the Northwest Electric Light and Power Association, to be held at Gearhart, Ore., June 25-27, has been sent to all members of the association. General information concerning the convention, transportation, and hotel accommodations has also been sent out.

The Hotel Gearhart will be the headquarters for the convention and as many delegates as possible will be cared for there. Additional hotel accommodations will be provided at the Hotel Seaside, four miles from Gearhart. All convention sessions will be held in the Hotel Gearhart.

The program as announced by the general convention committee is as follows:

WEDNESDAY, JUNE 25

9:30 A.M.

General Session

Geo. L. Myers, president, presiding.

Address of Welcome.

Response.

Appointment of Convention Committees.

Annual report of secretary and treasurer, C. H. Cuffroy, Pacific Power & Light Company, Portland, Ore.

Annual address of the president, Geo. L. Myers, Pacific Power & Light Company, Portland, Ore.

Address, Franklin T. Criffith, president, National Electric Light Association, Portland, Ore.

Announcements.

2:00 P.M.

General Session Continued

Address—"Electrifying America," M. H. Aylesworth, managing director, National Electric Light Association, New York, N. Y.

Address—"The Potential Tomorrow," Irving E. Vining, president, Oregon State Chamber of Commerce, Ashland, Ore.

Paper—"Merchandise Accounting," C. W. Platt, Pacific Power & Light Company, Portland, Ore.

Paper, M. J. Wilkinson, Pacific Power & Light Company, Portland, Ore.

Paper, A. J. Johnstone, Portland Electric Power Company, Portland, Ore. (to be read by M. J. Wilkinson).

Address—"The Indeterminate Permit," J. A. Laing, Pacific Power & Light Company, Portland, Ore.

Address—"Taxation," A. A. Smith, Eastern Oregon Light & Power Company, Baker, Ore.

THURSDAY, JUNE 26

9:30 A.M.

Open Session of Public Relations Section

Norwood W. Brockett, presiding.

Address, George A. Hughes, president, Edison Electric Appliance Company, Chicago, Ill.

Discussion of the Bone Bill.

Report of Executive Committee.

Address—"Observations on Rural Electrification," Lewis A. McArthur, Pacific Power & Light Company, Portland, Ore.

Address—"Better Home Lighting Activity," A. C. McMicken, Portland Electric Power Company, Portland, Ore.

Reports of committees.

General discussion.

2:00 P.M.

Kilowatt Cup Golf Tournament.

FRIDAY, JUNE 27

9:30 A.M.

Concurrent Meetings of Sections

Accounting Section, A. N. Cudworth, presiding.
Commercial Section, W. M. Shepard, presiding.
Technical Session, John B. Fiskin, presiding.

8:00 P.M.

Executive Session.

Reports of committees.

Constitutional amendments.

Election of officers.

Joint Picnic Held by Northwest Electric Club Members

A joint picnic, the Electric Club of Seattle, Wash., and the Tacoma Electric Club participating, under the auspices of the Seattle organization was held at Enumclaw, Farmer's Picnic Grounds, on June 14. The frolic was an all-day affair and the program included a picnic lunch at noon, a ball game between the Seattle and Tacoma jobbers and dealers, field meet and dancing.

The general committee in charge of arrangements included: Joe Wells, of Fobes Supply Company, chairman; R. F. Cole, Economy Fuse Company, Charles Smutz, Western Electric Company, and James G. Stewart, Pacific States Electric Company. George Miles, of the Westinghouse Electric & Manufacturing Company, was chairman of the transportation committee.

COMING EVENTS

Pacific Coast Electrical Association—

Annual Meeting—Coronado, Calif.
June 16-20, 1924

Wyoming Public Utilities Association—

Annual Convention—Casper, Wyo.
June 23-24, 1924

Northwest Electric Light and Power Association

Annual Convention—Gearhart, Ore.
June 25-27, 1924

Pacific Coast Electrical Supply Jobbers' Association—

Quarterly Meeting—Del Monte, Calif.
July 24-26, 1924

New Manager Addresses San Diego Club.—Gen. George H. Harries, new manager of the San Diego Consolidated Gas & Electric Company, was the speaker of the day at the June 3 meeting of the Electric Club of San Diego, Calif. Gen. Harries used no particular topic for his talk, stating that he preferred to become better acquainted with the members of the club before using any definite subject. L. M. Klauber, general superintendent of the San Diego utility company, acted as chairman of the day at the meeting.

CORONADO AND GEARHART CALLING: ANSWER "I'M HERE"

In the days long gone to seed, when France was a feudal state and bold knights spent their days in philandering and fighting—

One of the boldest and bravest of that hardy lot was wont to rush into the fray, waving aloft his lance, shouting in terrifying tones,—

"I'm here!"

And, as the field slippery with blood and encumbered with broken armor could testify, he was there—there when the fight started and finished—there as

long as his will and way was contested and—

Today, several hundred years thence, this same knight, in the guise of a ballyhooper, issues a challenge in stentorian tones to men of the Electrical Industry—

Bidding them to be there and answer "I'm here" when the roll is called at Coronado and Gearhart.

Be at these conventions—one or the other, or both. Come prepared to give and receive—to teach and learn; come prepared to do everything in your power to make the sessions high lights in convention history.

Leave behind your trials and troubles; give your grouch and gloom the go-by and broadcast the sunshine of your presence.

Gird on your armor, furbish up your trappings, get a horse that will fit you and gallop to these gatherings. You are needed.

Come and do battle against the foes in the game who think checks marked N.S.F. are signs of good business; who think profits is spelled l-o-s-s; who would rather be wrong than rich.



Hasten, oh Knights! or by the rood thou shalt abye thy sloth!

Come and exchange clouts with them—give them round knocks on the sconce, maul their mazzards and slap their skulls—

Shout "I'm here!" and throw terror into their quaking souls.

The time has come when men of the Electrical Fraternity must stand and be counted—when the lambs be divided from the rams. The days of dilly-dallying are done and the—

Hurry! Hurry! Hurrah times are here.

These are the days of piping peace but, is life so dear or peace so sweet, as to be purchased at the price of ignorance and indifference?

I wot not—so—

Come to these conventions and lift your lusty voice in that stirring anthem—

"Together we stick; divided we're stuck."

Manufacturer, Dealer and Jobber Activities

The Electric Equipment & Manufacturing Company, Toledo, Ohio, manufacturer of Lead-All box bar, has appointed the Atlantic-Pacific Agencies Corporation, San Francisco, coast distributor for the line.

The Brown Instrument Company, Philadelphia, Pa., has recently published a 68-page booklet entitled, "Instructions for the Installation and Care of Thermo-Electric Pyrometers." The book is one of the most complete ever published on the subject. The publication contains information regarding protecting tubes for thermocouples and various methods of wiring indicators and recorders, methods of eliminating cold junction errors, methods of installing couples, and of checking thermocouples, wiring, or the accuracy of the instruments. These subjects are gone into from the practical and theoretical angles, as well as such other subjects as open and conduit wiring, mounting the instruments, locating defects in the thermo-electric circuit by various means, and many other points which will be of immense interest to the man who has to work with the equipment from day to day. This book also contains temperature millivolt equivalents for thermocouples and conversion of Fahrenheit and Centigrade scales. It is free to users of pyrometers.

The Globe Electric Supply Company of Denver, Colo., has been appointed agent for Colorado, Utah and New Mexico by the Railway & Industrial Engineering Company of Greensburg, Pa. The engineering company manufactures outdoor switching and protective equipment.

J. T. Pearson Company, of Detroit, Mich., has recently published a small pamphlet devoted to "End-O-Let." The device is designed for use in connection with conduit end fitting. The Pearson company is general sales representative for the End-O-Let company, manufacturers of the device.

The Novo Manufacturing Company has recently been organized in Los Angeles, Calif., by E. F. Ford, formerly owner of the Ford Electric Fixture Company of that city. The new company has moved into its newly constructed factory at 115 W. 16th Street and will specialize in the manufacturing of wrought iron fixtures and lanterns. An attractive catalog of the line of fixtures manufactured by the company has been issued recently.

The Atlas Electric Supply Company, Los Angeles, Calif., has recently added additional floor space to its establishment on San Pedro Street in order to allow the company to better display its samples of fixtures and glassware. The company is represented by L. Soldoff.

The Packard Electric Company, Warren, Ohio, has recently issued a new booklet, containing illustrations of the company's line of transformers, that has attracted considerable attention. The publication is illustrated with Macyart pictures, which, when viewed through colored lenses, give the picture the appearance of extraordinary depth.

The California Street Lighting Sales Company, Los Angeles, Calif., has been appointed exclusive distributor of the Union Metal Manufacturing Company's line in Los Angeles and southern California. As such the company will have charge of the distribution of all the Union Metal posts in that territory.

The Torrington Vacuum Cleaner Company has closed its factory branch in Denver, Colo.

The Art Metal Spinning Works of Denver, Colo., is extending its trade area with the appointment of Clayton P. DeLong, formerly of the fixture department of the Public Service Company of Colorado, as an outside salesman.

The Commercial Switchboard Manufacturing Company in Denver, Colo., has changed its name to the Commercial Manufacturing & Supply Company, according to recently amended articles of incorporation filed with the Colorado secretary of state.

The Automatic Electric Washer Company has announced the results of sales campaigns recently staged with the following central station companies: Utah Power & Light Company, 1,154 machines, Nebraska Power Company 406, Colorado Springs Light, Heat & Power Company 162, Southern Colorado Power Company 225, and Idaho Power Company 605.

The Cutter Company, Philadelphia, Pa., has issued a treatise on the protection of electrical currents. The book is of 96 pages and includes text and illustrations covering the facts. The book is entitled "Hand Book of the U-RE-LITE." The book may be secured by addressing the Cutter Company.

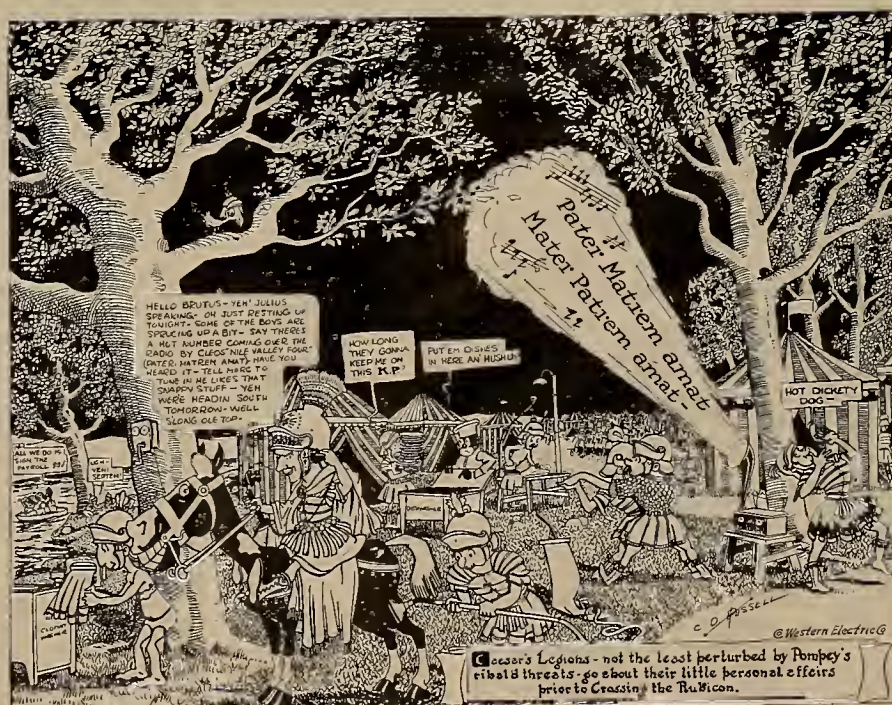
Another uptown electrical shop has been established in Denver, Colo., at 408—15th Street. Harry Shockett, who has maintained a shop in the West Colfax district for several years, is the proprietor. Both places will be maintained by Shockett.

The Westinghouse Electric & Manufacturing Company has recently published a new booklet, known as Folder 4532-A, dealing with Westinghouse fabrics and papers for insulating purposes. All the forms of treated and untreated fabrics, papers, sleeving, tapes, cord and thread manufactured by the company are fully described in the booklet and their principal applications given. For the purpose of easy reference, tables have been included setting forth in tabulated form the thickness, width, approximate weight, and size of the various materials described. For the treated fabrics and for the untreated fabrics and papers, approximate breakdown voltages have been given for each material under these classifications.

The Edison Lamp Works of the General Electric Company, Harrison, N. J., has recently prepared for distribution by retail dealers, two new novelties for building good will. A leather notebook and a leather keytainer are the new novelties that have been prepared and which can be secured with the dealer's name imprinted on them at small cost. Each device is of attractive appearance and should be well received by customers. Orders for lots of 100 or more are being received by the company.

The Paine Company, Chicago, Ill., has moved from 1742 West Van Buren Street to 2949 West Carroll Avenue in the same city. The company now occupies its own building at the new location and will manufacture toggle bolts, expansion shells and other metal specialties there.

W. Wesley Hicks, San Francisco, Calif., has brought out a new type of electric water heater equipped with thermostat and made in sizes from 1 kw. to 100 kw. capacity. The heater is heavily lagged to reduce radiation losses and has removable copper heating chamber and removable heating core.



C. D. Russell, for Western Electric Company.

ELECTRIFIED HISTORY — CAMP LIFE IN ANCIENT ROME

Personals

Berkeley H. Snow, former district manager at Hood River, Ore., for the Pacific Power & Light Company, has been appointed Northwest editor of the *Journal of Electricity*. Mr. Snow's resignation became effective May 15,



BERKELEY H. SNOW

and he will make his headquarters in Portland where he will open offices. Mr. Snow was born in Portland, July 8, 1891, and on completion of his early schooling at the Portland Academy, entered Cornell University, Ithaca, N. Y., where he graduated in 1913. In the fall of that year he entered the employ of the Pacific Power & Light Company as chief clerk at Vancouver, Wash., and from that time on was transferred from time to time as chief clerk or cashier to White Salmon, Prosser, and Pasco, Wash., and Pendleton, Ore. In 1917 he enlisted in the engineer corps of the American army, and after two years of varied military experience in which he received a commission and participated in the three major offensives with the 4th Engineers, IV Division, he was discharged in the summer of 1919. He returned to his old company and early in 1920 was sent to Hood River as district manager.

Harry C. Tilden recently joined the sales force of The Electric Corporation in Los Angeles, Calif. Mr. Tilden was formerly connected with the H. L. Miller Company in Pasadena, Calif., and also was employed for a number of years in the power sales department of the Southern California Edison Company, Los Angeles.

George Kidd and A. T. Goward, president and vice-president, respectively, of the British Columbia Electric Railway Company, Vancouver, B. C., have returned from an extended vacation in Europe and have again taken up their duties.

John F. Greenawalt, publicity director for the Mountain States Telephone & Telegraph Company, Denver, Colo., was the principal speaker recently before the regular luncheon of the Denver section of the American Institute of Electrical Engineers.

A. E. Peat, treasurer and comptroller of the San Joaquin Light & Power Corporation, Fresno, Calif., recently left on a three months' trip to Europe. Mr. Peat is visiting England for the primary purpose of attending the World Power Conference in London. From there he will visit the large engineering projects in France, Belgium and Italy, particularly in the northern part of the latter country where he will investigate hydroelectric development.

W. A. Brackenridge, vice-president, Clifton Peters, secretary, and H. C. Rice, appliance sales agent, of the Southern California Edison Company, Los Angeles, Calif., attended the National Electric Light Association convention at Atlantic City, N. J.

W. G. Vincent, Jr., vice-president of the Pacific Gas and Electric Company, San Francisco, Calif., is in the East on business.

J. A. McWilliams, sales manager of the Valley Electrical Supply Company, Fresno, Calif., resigned June 1 to accept a position with the Metropolitan Life Insurance Company, San Francisco. Mr. McWilliams was identified with the Washington Water Power Company of Spokane, Wash., for twelve years, for five years of this time as one of their district managers. This position he resigned in the summer of 1922 to come to California for his wife's health. Locating in Fresno, he became affiliated with the Valley Electrical Supply Company as a range specialist, later being promoted to manager of range sales. When his company inaugurated its program of expansion he was promoted to sales manager. In this capacity he guided the work of organization in a creditable manner, and his leaving is felt as a direct loss to the industry.

Hugh Gordon, attorney for the California Railroad Commission, San Francisco, Calif., for the last four and a half years, has tendered his resignation, effective as of July 1, and will move to Los Angeles to resume the private practice of law. Prior to becoming attorney for the Railroad Commission Mr. Gordon was assistant city counsel of Los Angeles County.

Miss Bertha J. Dale, assistant manager of the personnel department, Pacific Gas and Electric Company, San Francisco, Calif., and secretary of the Pacific Service Employees' Association, took an active part in the arrangements for the Association's dinner held June 14 at the Civic Auditorium, San Francisco.

L. D. Collins, representative of the Western Electric Company with headquarters in Phoenix, Ariz., was a recent visitor to Los Angeles, Calif.

M. H. Aylesworth, managing director of the National Electric Light Association, New York City, will attend the annual convention of the Pacific Coast Electrical Association to be held at Coronado, Calif., June 16-21.

Walter S. Rugg, general sales manager of the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., is making a tour of the entire United States. He has already visited the Intermountain country and will spend some time on the Pacific Coast before returning to the factory.

W. E. Dufey, assistant treasurer of the San Joaquin Light & Power Corporation, Fresno, Calif., recently spent several days in Los Angeles.

E. L. Barnes, president of the Barnes-Lindsley Manufacturing Company, Portland, Ore., was a recent visitor to San Francisco, Calif., stopping there on his way to eastern points.

S. W. Bishop, executive manager of the Electrical Cooperative League, Denver, Colo., is taking the illumination design course at Nela Park, Cleveland, Ohio.

Major-General George Herbert Harries, a vice-president of H. M. Byllesby & Company, arrived in San Diego recently to take up the management of the San Diego Consolidated Gas & Electric Company, assuming the position left vacant by the transfer of H. H. Jones to Minneapolis. It is understood that he is not to have permanent charge of the San Diego utility but that his plans include visits to other Byllesby properties on the Pacific Coast. General Harries, a native of Havensford, South Wales, took degrees at Howard University and Kentucky State University, and soon began a military career replete with brilliant episodes. In 1895, after campaigns in the Western Indian wars, he was made a brigadier general commanding the army and navy militia in Washington, D. C. In the Spanish-American war he served before the siege of Santiago. In the World War, he commanded a brigade of colored infantry on the front. Later, because of his extensive executive training in utility management, he was placed in charge of construction and operation of the port of Brest. In the course of his military career he has received, beside the U. S. Navy Distinguished Service Medal, honors from eight European governments including the French Legion of Honor. In civil life, General Harries' career has likewise been vivid. In 1895 he became president of the Metropolitan Railway



MAJ.-GEN. G. H. HARRIES

Company, Washington, D. C., and later, vice-president of the Washington Railway & Electric Company. In 1911 he became identified with H. M. Byllesby & Company, and was shortly made president of the Louisville Gas & Electric Company. He has been a director of the Standard Gas & Electric Company and of H. M. Byllesby & Company for some years, and is a past president of the American Electric Railway Association, the Association of Edison Illuminating Companies and the Illuminating Engineers' Society.

Franklin T. Griffith, president of the Portland Electric Power Company, Portland, Ore., will be in attendance at the annual convention of the Pacific Coast Electrical Association to be held at Coronado, Calif., June 16-21.

J. G. Monahan and G. F. Wakeman of the Edison Storage Battery Supply Company, Los Angeles, Calif., recently spent considerable time at San Pedro, Calif., in connection with an important marine installation of Edison batteries.

H. D. Randall, General Electric Company; J. P. Sprunt, Westinghouse Electric & Manufacturing Company; E. P. Kipp, Hazard Manufacturing Company; and F. L. Easton, Economy Fuse & Manufacturing Company, were unanimously elected to serve as representatives of the Manufacturers' Division on the Advisory Board of the Electrical Cooperative League, Denver, Colo., at the Division's last meeting of the fiscal year held early in June.

Preston Millar, president of the Electrical Testing Laboratories, New York City, was a recent Los Angeles, Calif., visitor. While there he addressed a special meeting of the Electric Club attended by over three hundred prominent members of the electrical industry in Los Angeles and southern California.

Ellery W. Stone, since May, 1922, sales manager, radio department, Pacific States Electric Company, San Francisco, Calif., has resigned to become president of the Federal Telegraph Company of that city. It is felt that Mr. Stone's knowledge and experience make him particularly well fitted for the position. Prior to his service with the Pacific States Electric Company, in 1922 he made a survey of the radio situation in China, particularly in the south, at the request of officials of the Southern Chinese government. Mr. Stone was general manager of Moor-



ELLERY W. STONE

head Laboratories from 1920 to 1922, and for a year prior thereto was California manager for Kilbourne & Clark Manufacturing Company and its subsidiary, Ship Owners' Radio Service, Inc., in charge of Los Angeles and San Francisco offices. From 1914 to 1917 he was U. S. radio inspector for the sixth radio district, San Francisco, and the next two years served as district communications superintendent of the Eleventh Naval District, San Diego, Calif. He is the author of two books on radio and of many technical papers.

Harry Hartzell, of Maydwell & Hartzell, Inc., San Francisco, Calif., is on an extended trip through the Northwest in the interest of his firm. He will visit among other places Portland, Ore., and Seattle and Spokane, Wash.

Roy Worth, assistant district manager of the Pacific States Electric Company, San Francisco, Calif., recently spent a few days in Los Angeles, Calif., with the local representatives of that company.

A. E. Buttner, general manager of the Electrical Specialty Company, San Francisco, Calif., has just returned from an extensive trip to eastern cities. While in that territory, Mr. Buttner visited many of the factories represented by his company.

Fay Woodmansee, president of the Electrical Engineers' Equipment Company, electrical manufacturers of Chicago, Ill., recently spent several weeks in Los Angeles and southern California.

Ray W. Turnbull, assistant Pacific Coast sales manager of the Edison Electric Appliance Company, with headquarters in Portland, Ore., was recently in Spokane, Wash., in connection with sales matters. He also visited several important towns served by The Washington Water Power Company of Spokane, in company with J. F. Farquhar, general agent.

C. W. Platt, since 1912 assistant secretary and treasurer of the Portland Gas & Coke Company, Portland, Ore., has been chosen secretary and treasurer of that company and the Pacific Power & Light Company, also of Portland, taking the place left vacant by the death of George F. Nevins. Mr. Platt's service with the former company dates from April, 1909, when he became chief bookkeeper. Prior to that time he spent a brief term as draftsman for one of the subsidiary companies of the Bell telephone system, and served four years in the accounting department of the Union National Bank of Pittsburgh, Pa.

Fred S. Mills, Pacific Coast representative of Curtis Lighting, Inc., has just recently removed from the Pacific Finance Building in Los Angeles, Calif., to the Merchants National Bank Building, where he has opened an engineering and fixture establishment. Mr. Mills announced that he lately opened offices in the Terminal Sales Building, Seattle, Wash., with Charles G. Boyd in charge. This is in addition to his San Francisco office, which has been in operation for some time.

L. A. Blackburn, of the merchandising division of the Westinghouse Electric & Manufacturing Company, San Francisco, Calif., left on May 28 for an extended trip to the works at Mansfield, Ohio, East Pittsburgh, Pa., and South Bend, Ind. From Mansfield he will go to Pittsburgh and will return by way of South Bend, visiting the George Cutter Works there.

Edgar G. Bartell, formerly in the electrical fixture business in St. Louis, Mo., has just recently joined the Los Angeles, Calif., staff of Fred S. Mills, Pacific Coast representative of Curtis Lighting, Inc.

F. L. Easton, Economy Fuse & Manufacturing Company representative in Denver, Colo., is at Hot Springs, Va., where he will attend a national sales reunion and conference of the Economy Fuse & Manufacturing Company and also the Electrical Jobbers' convention.

Harold E. Willis, since September, 1923, president of the Sacramento Valley Electrical Society, and one of the organizers of that association, has been affiliated with the electrical industry since 1906. In that year he entered the employ of the Northern Electric Railroad at Chico, Calif., and became successively traveling auditor, chief clerk and traffic manager. In 1908 he joined the Central California Transportation Company, San Francisco, as auditor of freight and passenger accounts. Three years later, as traffic manager and superintendent, he took charge of the



HAROLD E. WILLIS

logging railroad of the Verdi Lumber Company in Nevada. He became associated with the Oakland, Antioch & Eastern Railroad in 1916 as traveling freight and passenger agent with headquarters in Marysville, Calif. Since 1921 he has been general agent of the San Francisco-Sacramento Railroad at Sacramento, Calif. Mr. Willis is an active worker in the Chamber of Commerce, the Rotary Club and other fraternal and civic organizations.

Obituary

Thomas Commerford Martin, from 1882 to 1909 editor of Electrical World and for the following ten years secretary of the National Electric Light Association, died May 18 at Pittsfield, Mass. Mr. Martin was actively associated with the development of the electrical industry, particularly electrical engineering and related phases. For two years he was affiliated with Thomas A. Edison in laboratory work and electrical development. He was one of the founders and charter members of the American Institute of Electrical Engineers, and a charter member and past president of the New York Electrical Society, as well as a member of numerous other electrical and engineering societies. Mr. Martin was also the author of a number of books, "Edison, His Life and Inventions," being probably his best known work.

Stanley S. Stevens, manager of Stevens Sales Company, Salt Lake City, Utah, died May 17, following an automobile accident.

Trade Outlook

San Francisco

Reports from the different branches of industry indicate that business in general in this territory is fair. Building and general construction contracts already let assure continued activity in this line, although the demand for lumber for new work has somewhat subsided.

The hoof and mouth epidemic is regarded as completely under control, and all bans on travel have been lifted so that motorists and other tourists may travel in all parts of California without inconvenience. Merchants dealing in vacation and camp supplies report a fair demand for the opening of the season.

A substantial increase in trade between San Francisco and Cuba is looked for, due to the fact that the Cuban sugar crop is expected to be a bumper. Cuba imports California beans and canned fruits and vegetables in large quantities, and the additional buying power made possible by the big sugar crop should result in heavy orders for these commodities as well as manufactured articles.

Although general business conditions have been quiet for several months, attention is invited to the fact that this period is normally the least active of the year, that the end of that period is approaching, and there is no reason not to expect a steady increase from now on.

Los Angeles

Business conditions in Los Angeles have improved somewhat during the first week in June as compared with the preceding two weeks in May, and this is especially true in the electrical industry. Retail sales have picked up immeasurably. The sale of radio apparatus is good and shows signs of steady improvement, which is expected to continue well into the summer months. Wholesalers are well pleased at present prospects and are much more optimistic than they have been during the past few months, despite the slump in the building industry, which shows a decline of approximately fifty per cent for the last two weeks of May as compared with the corresponding period last year.

Manufacturers continue to report excellent business conditions prevailing and anticipate their continuing. The unemployment situation in Los Angeles is not considered serious, even though there has been a number of men out of work due to the recent foot and mouth epidemic and to the decline in the building industry. Steady improvement is looked for soon.

Portland

Electrical jobbers report sales slow in the smaller heating devices and confined to immediate needs. Ranges are selling about as well as a year ago, with the average of all sales somewhat less than in 1923.

In the lumber industry production keeps up well. It is at present about 10 per cent below that of a year ago,

although there are indications of a revival of the kind of business enjoyed in 1923. Some logging crews have stopped work because of the great fire hazard of logging under present weather conditions.

The lack of rainfall has caused damage in the agricultural districts, although so far the orchards have not suffered greatly. Power companies in Portland are running 30 per cent on stream.

Building permits issued during the past month in Portland were about equal to those of May, 1923, with a slight increase in the number of residences. Bank clearings for the month showed an average daily increase of \$100,000 over those for the same month a year ago. There was also a gain in shipping. Unemployment is on the increase, due partly to the influx from neighboring states.

Salt Lake City

Extensive rains have brought great relief to sugar beets, spring grains and other crops, and assured the maturing of much dry land grain. With good crops certain, the Intermountain country may look forward to a prosperous season.

There appears to be an unusually large amount of activity among the electrical contractor-dealers in Salt Lake City. This is brought about not only by the building of many new homes, but also by the remodeling of many present homes, with resultant improvement in wiring and inclusion of more convenience outlets so that the entire electrical installation is made more modern and convenient.

Inquiry among the jobbers brings out the fact that their business for the first five months of this year shows a fair increase over that of the same period of last year, and that they are looking forward to continued improvement.

To meet increasing requirements for service, the Utah Power & Light Company is entering upon a summer program involving improvements and increased facilities in its Salt Lake City distribution system and also at other points on its lines.

An improvement is noted generally in credit conditions and collections.

Spokane

Mining conditions continue to be good. A number of large operating companies have declared substantial dividends, and the industry is characterized by a feeling of optimism and confidence.

The past two weeks have been marked by continued dry weather, with the exception of one heavy rain in the Colville Valley north of Spokane. Concern is manifested throughout the Inland Empire over the lack of rain, and heavy losses in the wheat crop are anticipated. This condition is leading to cancellation of orders for farm machinery, and has already affected retail trade in Spokane.

The packing business has been running at reduced output owing to decline

in the amount of live stock shipments to Spokane. This is regarded, however, as merely a temporary condition.

The woodworking plants have nearly all reduced output on account of slackness of demand in Eastern markets. Lumber prices are lower in Spokane than they have been for a long time, and it is hoped that builders will take advantage of this situation. The box factories are prepared for a dull season, because of the large reduction in fruit output anticipated for the season.

General construction work is rather dull, but road contracts being placed now will stimulate activity.

Denver

Business conditions in Denver point to sustained prosperity. During April, Denver showed a 7.1 per cent increase in building permits. Last month the amount of permits issued was \$3,027,550, an increase of \$2,850 over May of last year, when all records were broken. Figures for the first five months of this year show building permits totaling \$10,483,300 in value, an increase of \$1,020,550 over the first five months of last year.

It is estimated that Colorado will produce more than twice as many bushels of wheat as it did last year, and that its bean acreage for 1924 will be about 60 per cent greater than the 1923 total.

Recent heavy rains have improved the soil conditions materially throughout the state although they have delayed farm work somewhat. Bountiful crops are predicted in all sections, and there is a decided feeling of optimism.

Denver showed an increase in bank deposits on May 1 of \$2,779,900 over those of a year ago. In the last month Denver banks gained \$551,030 in bank deposits. Department stores report gains in net sales and better collections than at this time twelve months ago.

Seattle

Reports from the leading stores in Seattle show a slight slackening in the volume of retail trade. There is no overstocking. Purchasing is cautious, with expenditure largely for necessities. Collections have slowed up materially.

The lumber situation shows little change and is anything but satisfactory. Every branch of the industry is indirectly affected, of course, by the slackening in commercial logging operations. Northwest lumbermen look at the problem as one solely of overproduction, which will gradually be overcome. Wages in camps and mills have been sharply reduced.

Building permits for the month of May reached a total of \$3,200,000. Seattle building continues exceptionally strong, a feature of the situation being the unusually large number of homes, of the better quality, now under construction.

Seattle contractor-dealers in the electrical business report the past two weeks' volume on a parity with the preceding two weeks, and predict that June will show a very substantial increase, especially in sale of electrical gifts. Considerable volume of new contracting is under way, due to the large building program in the city, and this work is expected to show increase. Competition is keen, and prices not generally satisfactory. Stocks are in good shape and replacements easy. Collections are reported satisfactory.

